NOTICE

All drawings located at the end of the document.

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FINAL CLOSE-OUT REPORT

BUILDING 123 DECOMMISSIONING PROJECT

As Required by the Rocky Flats Cleanup Agreement

Rocky Mountain Remediation Services, L.L.C.

REVISION 0

SEPTEMBER 1998

PROJECT FINAL CLOSE-OUT REPORT
BUILDING 123 DECOMMISSIONING PROJECT

This Final Close-Out Report for the Building 123 Decommissioning Project has been reviewed and approved by:

Kent D. [signature]
Kaiser-Hill Project Manager

9/25/98
Date

[signature]
RMRS Project Manager

9/25/98
Date

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS iii

1.0 INTRODUCTION 1

2.0 REMEDIAL ACTION DESCRIPTION 1

2.1 GENERAL 1

2.1.1 Environmental Readiness Evaluation 1
2.1.2 Integrated Safety Management 2

2.2 RELOCATION OF BUILDING TENANTS, EQUIPMENT AND CHEMICALS 2

2.3 CHARACTERIZATION 2

2.4 STRIP-OUT AND ASBESTOS ABATEMENT 3

2.4.1 Strip-Out 3
2.4.2 Asbestos Abatement 4
2.4.3 Unforeseen Site Conditions 5

2.5 DEMOLITION 6

2.6 WASTE MANAGEMENT 6

2.7 IHSS CHARACTERIZATION 6

3.0 REMEDIAL ACTION GOALS VERIFICATION 7

3.1 REMEDIAL ACTION GOALS 7

3.2 REMEDIAL ACTION DELIVERABLES 9

3.3 DOCUMENTATION OF REMEDIAL ACTIONS 9

4.0 RCRA CLOSURE (VERIFICATION OF TREATMENT PROCESS) 9

5.0 RADIOLOGICAL ANALYSIS 10

6.0 WASTE STREAM IDENTIFICATION 11

7.0 SITE RECLAMATION 11

8.0 DEVIATIONS FROM THE DECISION DOCUMENT 11

9.0 DEMARCATION OF WHERE EXCAVATION TOOK PLACE 11

10.0 DEMARCATION OF WASTES LEFT IN PLACE 11

11.0 DATES AND DURATION OF SPECIFIC ACTIVITIES 12

12.0 FINAL DISPOSITION OF WASTES 12

13.0 LESSONS LEARNED 12

14.0 CONCLUSION 13

15.0 REFERENCES 13

ATTACHMENTS

Attachment 1—Project Location and Building Floor Plan
Attachment 2—Photographs
Attachment 3—Performance Measure
Attachment 4—Proposed Action Memorandum for the Decommissioning of Building 123 (PAM)
Attachment 5—Environmental Readiness Review Documentation
Attachment 6—Property Disposal Inventory, Economic Disposition Plan, and Documentation of Proper Storage and Handling
Attachment 7—Reconnaissance Level Characterization Report
Attachment 8—Certificates of Closure for the Building 123 Components of RCRA Unit 40
Attachment 9—Asbestos Abatement Completion Documentation, Demolition Notification, and Approvals
Attachment 10—Certification of Destruction
Attachment 11—Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123
Attachment 12—Documentation of Additional Conditions of the PAM
Attachment 13—Building 123 Administrative Record Document Summary
Attachment 14—Waste Management Plan for Building 123
Attachment 15—Waste Generation Summary
Attachment 16—Toxicity Characteristic Leaching Procedure (TCLP) Sample Analysis
Attachment 17—Lessons Learned for the Building 123 Decommissioning Project
Attachment 18—Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Data Summary Report
Attachment 19—ER Ranking
Attachment 20—Radiological Characterization Information for the Building 123 Slab

TABLES

3-1 Verification Documentation and Remedial Actions 8

ACRONYMS

ACM	Asbestos containing materials
CDPHE	Colorado Department of Public Health and Environment
DOE	US Department of Energy
DWRC	Denver West Remediation & Construction, L.L.C.
ERE	Environmental Readiness Evaluation
IHSS	Individual Hazardous Substance Sites
K-H	Kaiser-Hill Company, L.L.C.
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
PAM	Proposed Action Memorandum
PEP	Proposed Execution Plan
ppb	Parts per billion
RCRA	Resource Conservation and Recovery Act
RFETS	Rocky Flats Environmental Technology Site
RMRS	Rocky Mountain Remediation Services, L.L.C.
SAP	Sampling and Analysis Plan
SSOI	Safeguards, Security, Site Operations and Integration
TCLP	Toxicity Characteristic Leaching Procedure
TSDF	Treatment, storage and disposal facility
WEMS	Waste and Environmental Management System
WSRIC	Waste Stream Residue Identification and Characterization

PROJECT FINAL CLOSE-OUT REPORT
BUILDING 123 DECOMMISSIONING PROJECT

1.0 INTRODUCTION

The purpose of this close-out report is to document completion of the Building 123 Decommissioning Project. This report is formatted as required by the Rocky Flats Cleanup Agreement Implementation Guidance Document. This report also documents completion of performance, as defined in the Rating Plan for Performance Measure 97-C5.01R (see Attachment 3).

The objective of this project was to decommission Buildings 123, 113, 114, and 123S in support of the Rocky Flats Environmental Technology Site (RFETS) Ten-Year Plan to close the site. Building 123 was targeted for decommissioning because it was believed to be relatively low-risk. Decommissioning of the Building 123 structure offered an opportunity to strengthen the decommissioning expertise on a moderately sized, relatively low-risk building. The other buildings were small structures immediately adjacent to Building 123 and could be conveniently and economically removed when Building 123 was demolished. A brief description of the decommissioning tasks is provided in Section 2.0 of this report. Drawings showing the project location and the Building 123 floor plan may be found in Attachment 1. The photographs are located in Attachment 2.

The decommissioning of Building 123 was done according to the *Proposed Action Memorandum for the Decommissioning of Building 123* (PAM), Revision 6, dated March 26, 1998 (Attachment 4). The PAM provides a detailed description of the decommissioning tasks for Buildings 123, 113, 114, and 123S. These tasks included decontamination of radiologically contaminated facility systems, partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40, and characterization of Individual Hazardous Substance Sites (IHSS) 121 and 148.

2.0 REMEDIAL ACTION DESCRIPTION

2.1 GENERAL

Decommissioning of Buildings 123, 113, 114, and 123S was conducted in three major phases: Strip-Out, Asbestos Abatement, and Demolition. A description of each phase is provided in Sections 2.4 and 2.5 below. Prior to implementation of these three main phases, the following activities occurred:

2.1.1 Environmental Readiness Evaluation (ERE)

Throughout the majority of the project, and Environmental Readiness Evaluation (ERE) was conducted by Kaiser-Hill Company, L.L.C. (K-H) and U.S. Department of Energy (DOE). The purpose of the ERE was to review documentation prepared to support the project and conduct interviews with various project personnel, to determine whether the project was prepared to proceed with each major phase (Strip-Out, Asbestos Abatement, and Demolition). Findings and observations from the ERE team were addressed by the project team and corrected prior to initiation of work. ERE approval from K-H and DOE was required prior beginning Strip-Out, Asbestos Abatement, and Demolition. Documentation of each of the three ERE reviews is attached in Attachment 5.

2.1.2 Integrated Safety Management

Consideration for safety was integrated into all facets of the Building 123 Decommissioning Project. The Integrated Safety Management principles (defining scope, identifying hazards, implementing controls, performing the work, and providing feedback) were implemented during general project planning, during the preparation of project plans and documents, and during daily execution of project tasks. On a project level, hazards were defined as the scope was being developed. Resources were allocated and the project schedule was designed to address implementation of the required controls. Project plans (such as sampling plans, radiological survey plans, engineering documents, and Integrated Work Control Packages) addressed scope, hazards, and necessary controls at a more detailed level. Finally, hazards and controls were addressed during the daily execution of work tasks in Plan of the Day meetings and through the development of Activity Hazard Analyses. As a result, the project was successfully completed with only two Occupational Safety and Health Agency Recordable Accidents: one bee sting, and one sore knee.

2.2 RELOCATION OF BUILDING TENANTS, EQUIPMENT, AND CHEMICALS

Decommissioning of Building 123 began with the relocation of building tenants, and removal of furniture, equipment, and excess chemicals. An Economic Disposal Plan was developed for the excess furniture and equipment by the RFETS Property Utilization and Disposal Department and the K-H Safeguards, Security, Site Operations and Integration (SSSOI) Department. Excess chemicals were inventoried, classified, and either shipped to an approved off-site treatment, storage and disposal facility (TSDF), or stored on-site in accordance with the Waste Chemical Consent Order and RFETS procedures. Attachment 6 contains a portion of the Property Disposal Inventory and Economic Disposition Plan (the actual documentation is of considerable size and is on file with K-H SSSOI and correspondence documenting the disposition of waste chemicals in Building 123.

2.3 CHARACTERIZATION

The buildings were then characterized for hazards and potential contamination. The *Reconnaissance Level Characterization Report for Building 123,* October 1997 (Attachment 7) identifies the type, quantity, condition, and location of both confirmed and potential sources of radioactive and hazardous substances which were present in Building 123. No significant hazards were identified in Buildings 123S, 113, and 114. Hazards identified in Building 123 are listed below:

- Asbestos
- PCB's in light ballasts
- Fluorescent Light bulbs (were handled as hazardous waste due to mercury)
- Perchloric acid
- Chemicals
- RCRA hazardous waste
- Radiological contamination
- Metals (lead, chromium, cadmium, an arsenic) in paint

Characterization was followed by detailed planning, engineering, and award of subcontracts for strip-out, asbestos abatement, and building demolition.

2.4 STRIP-OUT AND ASBESTOS ABATEMENT

During the strip-out and asbestos abatement phases of the project, all of the identified hazards were removed from the buildings in preparation for demolition. Most strip-out and asbestos abatement activities were conducted concurrently. Due to the presence of multiple contaminants in Building 123, removal of the hazards had to be carefully sequenced to minimize potential exposures to the workers. For example, explosion hazards from perchloric acid had to be eliminated before asbestos abatement could begin. Asbestos abatement often included the removal of materials that were radiologically contaminated, and that contained lead.

2.4.1 Strip-Out

Strip-out activities included the following tasks:

- Removal of radioactively contaminated asbestos floor tile.
- Removal of all carpet.
- Removal of all process hoods and associated ducting, including a thorough rinse of the hood and ducting system, process waste system, and process scrubbers for perchloric acid.
- Removal of all laboratory cabinets, counter tops, and sinks.
- Partial closure of RCRA Unit 40. Closure of this portion of RCRA Unit 40 included removal of above grade and use of extraction technology/rinsate sampling for closure of below grade portions of the piping, sumps, and pipe chases.
- Removal of a 68-ton lead/steel vault for refurbishment and shipment to Russia by DOE.
- Removal of miscellaneous items such as fire protection equipment which was salvaged for future use.

Strip-Out activities of special interest are summarized below:

Perchloric Acid Rinse

A strip-out activity of note was the removal of perchloric acid residues from the process ventilation and piping systems. As stated above, the entire hood, ducting, process waste, and scrubber system were flushed to rinse perchloric acid residues. The flushing procedure was developed by Resource Technologies Group under subcontract to the Strip-Out/Demolition Subcontractor [Denver West Remediation and Construction, L.L.C. (DWRC)]. Due to the explosive nature of perchloric acid, the process for rinsing and dismantling the system was meticulously planned by experienced personnel to ensure the safety of the workers implementing the procedure. The procedure was reviewed by independent expert s at the Oak Ridge National Laboratory prior to approval. Generally, all surfaces were wetted, power washed, and tested prior to cutting and removal. Mechanical connections were cut from the system, and disassembled while submerged under water.

Removal of the Lead/Steel Vault

Building 123 housed a 68-ton lead/steel vault that was once used for lung and body counting. The vault was constructed of unique steel manufactured prior to 1945. Steel manufactured prior to this date is free of radioactivity resulting from nuclear fallout, which makes the material valuable for use as shielding when measuring internally deposited radioactivity. DOE found that there was a need for the vault in Russia, and made arrangements for the vault to be removed, refurbished, and then shipped to the Russian government.

Prior to building demolition, temporary structural supports were installed and a bearing wall of Building 123 was removed. The vault was moved out of the building on cribbing, placed onto a trailer, and hauled to Lawrence Livermore in California for refurbishment and shipment.

Concrete Sampling

The concrete slab was sampled during the strip-out phase for radiological contamination. All sampling was conducted according to the *Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab*, December 1997. Characterization of the slab was necessary to determine levels of contamination due to the following features:

- Source pits: concrete lined pits installed during original construction for the storage of radioactive sources. These pits varied in depth from 8" to 18'.
- Floor drains which were used at one time to divert process waste through the original process waste line #P-2 to Building 374 for treatment.
- Secondary containment sumps for the active process waste lines in Rooms 156, 157, and 158.
- Process waste pump sumps in the courtyard and in Room 125.

Concrete core data was used determine which areas of the slab had radiological contamination, the extent of the contamination, and which areas of the slab needed to undergo additional decontamination or encapsulation. This data was also transmitted to the Rocky Mountain Remediation Services, L.L.C. (RMRS) Environmental Restoration Department for their use in ranking the IHSS. The Concrete Sampling and Analysis Plan and the results of this sampling may be found in Attachment 20.

2.4.2 Asbestos Abatement

Extensive asbestos abatement was also conducted in Building 123. Concurrent with strip-out activities, abatement of nonfriable asbestos was conducted. This included removal of the following asbestos containing materials (ACM):

- Asbestos containing cabinet linings.
- Counter tops with asbestos containing mastic.
- Doors with asbestos core material.
- Arc shutes in one of the building transformers.

This was followed by abatement under full containment for the following friable and non-friable ACM:

- Wall board (transite panels).
- Drywall, mud, and tape.
- Floor tile.
- Thermal insulation.
- Loose fill in concrete block.

All asbestos abatement was done in accordance with an Abatement Plan prepared by the Abatement Subcontractor and accepted by RMRS for K-H project personnel. Completion of abatement was confirmed by an independent, State Certified, abatement oversight personnel through visual inspections and clearance air sampling. All abatement, air sampling, and sample analysis was conducted in accordance with State regulations. Documentation demonstrating completion of asbestos abatement may be found in Attachment 9.

2.4.3 Unforeseen Site Conditions

The project encountered several unforeseen site conditions during the strip-out and asbestos abatement phases. In each situation, associated work was stopped, the project team called-in subject matter experts to help determine appropriate actions, health and safety issues were addressed, and work packages were modified to include the new actions. As a result, all unforeseen site conditions were addressed without safety issues. The following is a list of the conditions encountered:

- An abandoned duct was found above a suspended ceiling in Room 111. The duct was not properly supported and contained perchloric acid residues.
- Loose asbestos fill was found inside the cells of a concrete block wall.
- In Room 135, an additional room was constructed of transite within the original room walls.
- Stub-ups of old process waste piping were found underneath cabinets in several of the original laboratories.
- Asbestos mastic was found under the laboratory counter tops.
- High contamination areas were designated in Rooms 123 and 124.
- The extent of radiological contamination in Rooms 103 and 109 was much more widespread than originally anticipated.
- High contamination was also found on the south wall of Room 111.

2.5 DEMOLITION

Prior to demolition, all utilities were disconnected from the buildings. Utilities included power, water (domestic and fire), communications, alarms, steam, natural gas, plant air, and sanitary sewer. In addition, documentation verifying that all asbestos containing materials were removed was transmitted to the Colorado Department of Public Health and Environment (CDPHE) (Attachment 9).

Final radiological surveys were then conducted in Buildings 123, 113, 114, and 123S according to the *Close-Out Radiological Survey Plan for the 123 Cluster*, January 1998. Results are documented in the *Close-Out Radiological Survey Report for the 123 Cluster*, August 1998. Any areas that contained radioactive material above the unrestricted release criteria were decontaminated to meet the release criteria prior to demolition. However, some areas of the Building 123 slab could not be adequately decontaminated however. These areas were encapsulated with epoxy paint to fix any removable contamination in excess of the release criteria. These areas were also protected with steel plates, and will be evaluated during ranking of IHSS 121, 148 and the remaining building slab.

Once DOE approved the final radiological surveys, the buildings were demolished in accordance with a Demolition Plan prepared by DWRC and accepted by RMRS and K-H project personnel.

Certificates of Destruction were completed for each of the buildings once demolition was complete (Attachment 10). These were filed with the DOE Realty Officer.

All waste generated during demolition was also handled in accordance with the project *Waste Management Plan* and applicable plant procedures. All waste characterization, packaging, shipment, and documentation was supervised by a full time Environmental Coordinator/Waste Management Specialist. Refer to Section 12 for additional information on waste management.

2.6 WASTE MANAGEMENT

All waste generated during strip-out, asbestos abatement, and demolition was handled in accordance with the project *Waste Management Plan* (Attachment 14) and applicable plant procedures. All waste characterization, packaging, shipment, and documentation was supervised by a full time Environmental Coordinator/Waste Management Specialist. Refer to Section 12 for additional information on waste management.

2.7 IHSS CHARACTERIZATION

Upon completion of the building demolition, preliminary characterization of IHSS 121 and 148 was completed. The characterization was conducted in accordance with the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123* (SAP), May 1998 (Attachment 11). Results of the preliminary characterization are documented in the *Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Data Summary Report,* September 1998 (Attachment 18). The characterization data was used by the RMRS Environmental Restoration (ER) Projects Department to rank the IHSS. The ER Ranking spreadsheet is located in Attachment 19.

3.0 REMEDIAL ACTION GOALS VERIFICATION

3.1 REMEDIAL ACTION GOALS

Verification of remedial action goals for the Building 123 Decommissioning project is summarized in several reports. The following table, T*able 3-1, Verification Documentation and Remedial Actions* describes the remedial action described in the PAM, and the associated verification report.

Table 3-1 Verification Documentation and Remedial Actions

Remedial Action	**Verification Documentation**
Partial Closure of RCRA Unit 40	*Certification of Closure for the Building 123 Components of RCRA Unit 40*, May 1998 (Attachment 8).
Asbestos Abatement	Demolition Notifications to the CDPHE, Air Quality Control Division and clearance air sampling documentation (Attachment 9).
Decontamination of radiological contamination	*Close-Out Radiological Survey Report for the 123 Cluster*, August 1998.
Characterization of IHSS 121 and 148	*Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Data Summary Report,* September 1998 (Attachment 18).

Detailed descriptions of the RCRA Closure, radiological decontamination, and IHSS characterization may be found in the documents referenced above. These documents provide actual analytical results of samples and surveys. The *RCRA CertificationReport* and documentation related to asbestos abatement may be found in the referenced attachments. Due to the volume of information contained in the *Close-Out Radiological Survey Report*, this report will not be provided as an attachment. It has been distributed to DOE and is available for review upon request. The *Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Data Summary Report* and the *RCRA Certification Report* have also been distributed to DOE.

In addition, it should be noted that there were no releases to the environment due to the decommissioning of Buildings 123, 113, 114, and 123S.

3.2 REMEDIAL ACTION DELIVERABLES

In addition to the remedial action goals defined in the PAM, the CDPHE specified certain requirements that needed to be fulfilled as a condition of their approval of the PAM. These requirements are defined in the letter from the CDPHE to DOE dated August 25, 1997 (Attachment 12). Approval of the PAM was conditional, dependent on completion of the following actions:

1) Review and approval of the SAP.

2) Review and approval of the IHSS 148 Remediation Plan (Note: This action was deleted by an approved modification to the PAM on March 28, 1998)

3) Review and approval of the Unit 40 Closure Plan.

4) Review only of the Asbestos Abatement Plan.

5) Review and approval of the Demolition Plan.

Copies of approval letters for the SAP, the Closure Plan, and the Demolition Plan are included in Attachment 12. Also included is a transmittal letter for the Asbestos Abatement Plan. Modifications were made to the PAM in Revision 6, March 1998. This revision clarified that remediation was not included in the scope of this project. The Building 123 Decommissioning Project included only the characterization of IHSS 121 and 148. Therefore, a remediation plan is not required as part of the Building 123 PAM.

3.3 DOCUMENTATION OF REMEDIAL ACTIONS

All Administrative Records for the Building 123 Decommissioning Project have been tracked and controlled as required. Attachment 13 contains a summary of Building 123 documents and records.

4.0 RCRA CLOSURE (VERIFICATION OF TREATMENT PROCESS)

The only treatment process used during the Decommissioning of Building 123 was decontamination of some components of RCRA Unit 40 using an extraction technology. These operations were conducted as part of the *Closure Plan for Building 123 Components of RCRA Unit 40* (RCRA Closure Plan), Revision 0, November 12, 1997 and not the Building 123 PAM. A detailed description can be found in the RCRA Closure Plan and the report entitled *Certification of Closure for the Building 123 Components of RCRA Unit 40*, May 1998 (Attachment 8). A brief description of the closure status of RCRA Unit 40 in Building 123 is summarized on the next page.

The RCRA Closure Plan listed three options for closing the system:

1) Decontamination,

2) Disposal as RCRA listed mixed waste; and

3) Debris treatment.

All above-ground components of RCRA Unit 40 in Building 123 were removed and managed as RCRA listed mixed waste in accordance with Option 2 of the Closure Plan. This waste will be sent to an approved TSDF for disposal.

Closure of the pipe chases and sumps in Rooms 156 and 158 was done in accordance with Option 1 (decontamination) of the RCRA Closure Plan. Analytical testing confirmed that these components met RCRA Clean Closure Standards.

Closure of the pipe chases and sump in Room 157 was also done accordance with Option 1 of the Closure Plan. Analytical testing showed that nickel was present at 111 parts per billion (ppb) which is 11 ppb above the Tier 2 standard. Since nickel is not identified as a contaminant of concern and it is not a RCRA regulated hazardous waste, CDPHE has determined that no further action will be required for Sump 157.

Closure of the sump in Room 125 and the underground piping did not meet the Closure Performance Standards. The rinsate sample for Room 125 exceeded standards for lead (56 ppb versus (vs) 15 ppb) and rinsate sample for the underground piping exceeded standards for chromium (588 ppb vs 100 ppb) and lead (21.7 ppb vs 15 ppb). The Closure Plan deferred any areas not meeting Clean Closure Standards to the ER Department. ER evaluated data from soil samples, groundwater monitoring, and the rinsate analysis to rank IHSS 121, 148, and the under building contamination associated with Building 123. This evaluation will determine what, if any, remediation will be required for these areas. The ER ranking may be found in Attachment 19.

5.0 RADIOLOGICAL ANALYSIS

The *Close-Out Radiological Survey Report for the 123 Cluster*, August 1998 documents details of the radiological decontamination verification. As stated previously, this report is available for review upon request.

Buildings 123, 113, 114, and 123S were surveyed in accordance with the *Close-Out Radiological Survey Plan for the 123 Cluster, Revision 4*. This Plan incorporated guidance provided by the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (draft) and the *Manual for Conducting Radiological Surveys in Support of License Termination*, NUREG/CR-5849 (draft). Final disposition of building materials was determined following an analysis of the data obtained from the radiological surveys and samples collected during the final survey process. When compared against the 123 Cluster Derived Concentration Guideline Levels, and DOE's "No-Rad-Added Program", survey and sample results indicated that all building materials remaining following strip-out, except for the Building 123 concrete slab and paint covering the Room 111 south wall, could be released in an unrestricted manner.

Contaminated paint from Room 111 was removed and disposed of as low level radioactive waste prior to building demolition. Residual radioactivity in excess of the release criteria remains within the Building 123 slab and is located in what was once Rooms 109, 123, and 124. Attempts to remediate these areas failed. In an effort to protect these areas from the weather and demolition activities, the areas were sealed with a weather proof epoxy coating and covered with a steel plate bolted into the slab. In addition, abandoned source wells and process waste piping located in the Building 123 slab have not been fully characterized. The areas containing elevated levels of residual radioactivity, abandoned process waste piping, and source wells will be addressed during evaluation of IHSS 121, 148 and the Building 123 slab.

6.0 WASTE STREAM IDENTIFICATION

Waste generated during the project was handled according to the *Waste Management Plan for Building 123*, March 1998 (Attachment 14). This report included a summary of anticipated wastes and instructions for the disposition of each waste stream.

The tables in Attachment 15 list the waste streams and actual quantities of waste generated during the decommissioning of Buildings 123, 113, 114, and 123S.

7.0 SITE RECLAMATION

Soil remediation was not within the scope of this project. As described in the PAM, subsurface contamination identified during the course of the project will be evaluated by the RMRS ER Department.

8.0 DEVIATIONS FROM THE DECISION DOCUMENT

There are no deviations from the PAM. The PAM was updated regularly throughout the project to reflect changes in the project plan, scope, and/or sequence of activities. The last minor modification to the PAM was approved on March 28, 1998 (see Attachment 4).

9.0 DEMARCATION OF WHERE EXCAVATION TOOK PLACE

No excavation took place during the decommissioning of Building 123 project other than characterization drilling, conducted under the SAP. Refer to the SAP for locations of drill samples collected to characterize IHSS 121, 148, and the building slab. All drilling was done in accordance with a Rocky Flats Soil Disturbance Permit.

10.0 DEMARCATION OF WASTES LEFT IN PLACE

No wastes have been left in place. Buildings 123, 113, 114, and 123S were removed down to the respective building slabs. The building slabs are considered components of the IHSS and will be evaluated as part of the IHSS 121 and 148 ranking by ER.

11.0 DATES AND DURATION OF SPECIFIC ACTIVITIES

Planning for the Building 123 Decommissioning Project began in January 1997. Reconnaissance characterization of the buildings took place in September and October 1997. This was followed by engineering, evacuation of the building, and award of subcontracts for the building strip-out, asbestos abatement and demolition. Work by the subcontractors began in November 1997 and was completed in May 1998. Details of the work completed between November and May are provided in Section 2 of this report.

12.0 FINAL DISPOSITION OF WASTES

The table in Attachment 15 lists final volumes of all wastes generated during the Building 123 Decommissioning Project. Also included in Attachment 15 is a Waste Stream Residue Identification and Characterization (WSRIC) Summary for the waste streams generated during decommissioning of Buildings 123, 113, 114, and 123S. Each waste stream generated was assigned a waste code. The following is a summary of the waste code categories:

1. Non-radiologically contaminated, non-hazardous waste (including asbestos),
2. Non-radiologically contaminated, hazardous waste,
3. Radiologically contaminated waste (including asbestos); and
4. Low-level mixed waste.

Building materials were analyzed according to the TCLP to determine whether the wastes met Land Disposal Restrictions specified in 40 CFR 268. The data is summarized in Attachment 16. The results were presented to CDPHE, and it was agreed that the analysis data was adequate to demonstrate that the wastes were non- hazardous.

13.0 LESSONS LEARNED

The Building 123 Decommissioning Project was completed without serious personnel injuries or environmental impact, but the project experienced several unknown site conditions, which impacted the budget and schedule. Lessons learned for the project are stated in a report *entitled Lessons Learned for the Building 123 Decommissioning Project,* dated August 1998 (Attachment 17). An executive summary of the lessons is provided below:

1. The safety performance throughout the project was well managed and safety was always given top priority by all team members. However, attention to detail decreased some near completion of the field activities. There was not enough attention given to routine clean-up tasks, which resulted in a near-miss safety incident, which could have lead to an injury. The lesson learned is that safety awareness must be given highest priority from the start of the project through completion of all field activities.

2. The planning phase of the project was incomplete. The schedule was not given sufficient input and review from the performing organizations and was not tracked sufficiently during project execution. The Risk Analysis and Contingency Analysis did not address all potential areas of change. Several essential assumptions were not included in the Proposed Execution Plan (PEP). Team members changed significantly through the life cycle of the project which was disruptive and affected efficiency. Finally, the project planning documents were not as detailed as they should have been due to limited preparation time and limited access the facility.

3. Characterization of Building 123 was not allocated sufficient time and budget. The result was an incomplete reconnaissance survey of the building hazards and contamination. Access to the facility was limited due to late evacuation of the tenants, which restricted surveys and sampling. In addition, the characterization report was not updated to include new information on hazards and contamination as the information became available.

4. There was not a formal facility transition/turnover from Operations to the Project Team. No transition plan was developed and no final walkdown/inspection of the facility was conducted with the two parties. As a result, the Project Team accepted the building without full knowledge of the condition of the building. Building systems were reported as functioning, but were, in fact, not functional requiring maintenance. Materials and equipment were left in the building that the Project Team then had to disposition. The facility was not secured and new materials and chemicals were unexpectedly “dropped-off”.

5. The execution of the field work was complicated due to the fact that three separate subcontracts were awarded requiring the coordination of many different parties. The complicated coordination was complicated by the fact that several unforeseen site conditions were encountered (as described in Section 2.4.4).

6. Radiological requirements for the project changed several times, which impacted the schedule. Field supervision of the Radiological Control Technicians was not consistent. There was confusion between what DOE wanted and needed and what Radiological Operations was providing. Finally, data was not collected consistently, nor managed and tracked effectively.

7. The final radiological surveys had to be much more detailed that originally planned. The final report changed from Class III (10% survey with no grids) to Class I (100% survey with one meter grids) due to the additional radiological contamination found in the building. In addition, unexpected isotopes were identified which required work to be suspended until the contamination could be properly characterized.

14.0 CONCLUSION

The goals and objectives of the Building 123 Decommissioning PAM were fulfilled.

15.0 REFERENCES

Asbestos Characterization Report, Addendum to Building 123 Inspection, Revision 1, June 6, 1997.

Building 123 Decommissioning Project Execution Plan (PEP), Revision 4, September 11, 1997.

Building 123 Decommissioning Project Health and Safety Plan, Revision 1, February 1998.

Certification of Closure for the Building 123 Components of RCRA Unit 40, May 1998.

Close-Out Radiological Survey Plan for the 123 Cluster, Revision 1, January 1998.

Close-Out Radiological Survey Report for the 123 Cluster, Revision 0, August 1998.

Closure Plan for Building 123 Components of RCRA Unit 40 (RCRA Closure Plan), Revision 0, November 12, 1997.

Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab, Revision 0, December 1997.

ER Ranking, September 1998.

Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Data Summary Report, September 1998.

Lessons Learned for the Building 123 Decommissioning Project, August 1998.

Proposed Action Memorandum for the Decommissioning of Building 123 (PAM), Revision 6, March 26, 1998.

Reconnaissance Level Characterization Plan for Building 123, Revision 0, September 1997.

Reconnaissance Level Characterization Report, Revision 0, October 1997.

Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sties (IHSS) 121 and 148 at Building 123, Revision 1, May 1998.

Waste Management Plan for Building 123, Revision 1, March 1998.

Attachment 1

Project Location and Building Floor Plan

Attachment 2

Photographs

Color Photos

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BLDG. - 123
CONTRACTOR - DENVER WEST REMEDIATION & CONSTRUCTION
#50276 - 01 - LOOKING SW FROM SW CORNER OF BLDG. 331
12/4/97

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BUILDING 123
CONTRACTOR - DENVER WEST REMEDIATION AND CONSTRUCTION
#50643 - 06 - BUILDING 123 SLAB, LOOKING NORTHEAST AFTER DEMOLITION
5/27/98

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BUILDING 123
CONTRACTOR - DENVER WEST REMEDIATION AND CONSTRUCTION
#50629 - 20 - BUILDING 123, LOOKING NORTH AT FINAL DEMOLITION ACTIVITIES
FROM THE ROOF OF BUILDING 460
5/18/98

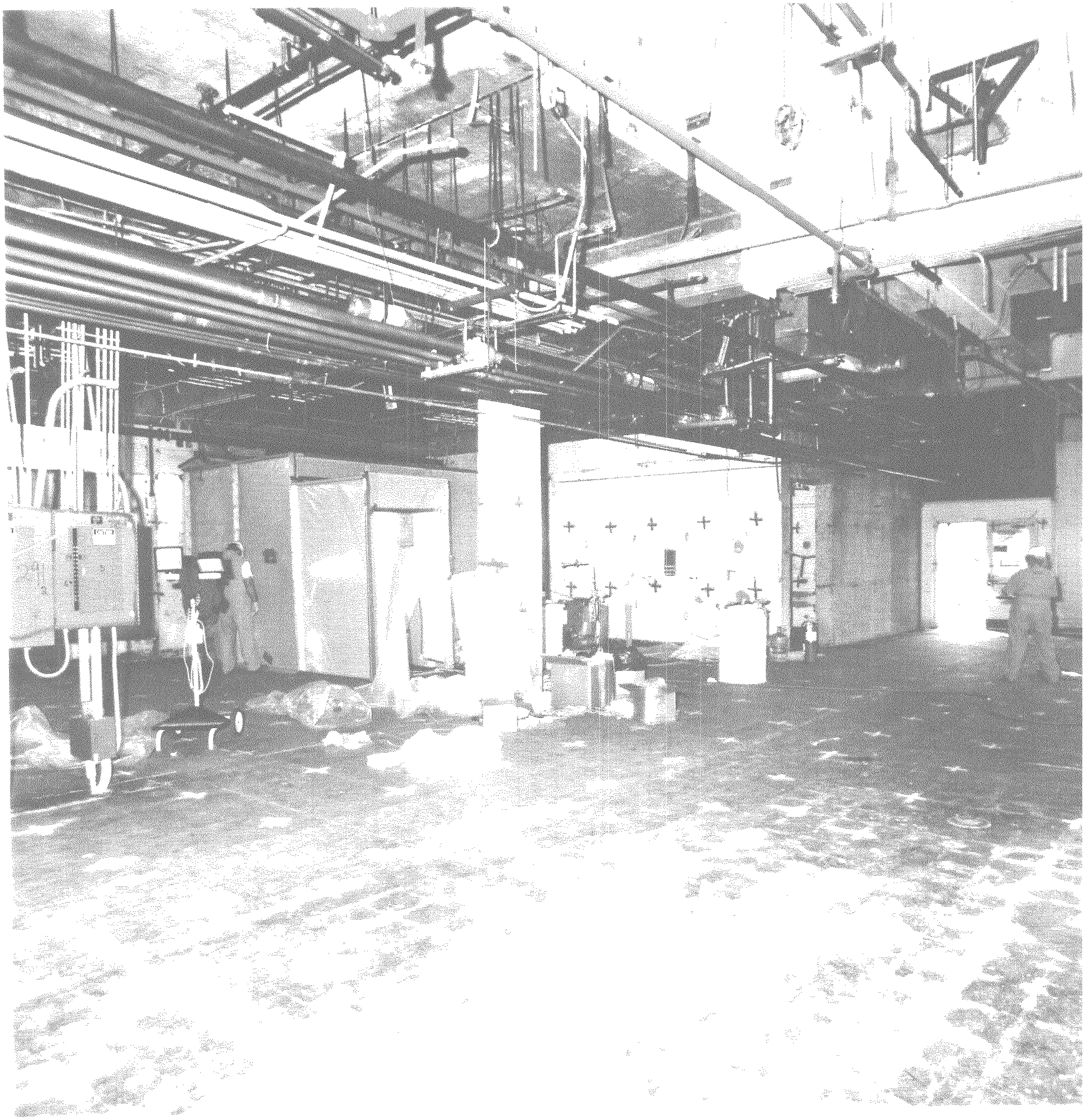
DESCRIPTION - ROCKY FLATS FIELD OFFICE
BUILDING 123
CONTRACTOR - DENVER WEST REMEDIATION AND CONSTRUCTION
#50623 - 20 - BUILDING 123, LOOKING NORTHEAST AT DEMOLITION ACTIVITIES
5/14/98

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BLDG. - 123
CONTRACTOR - DENVER WEST REMEDIATION & CONSTRUCTION
#50584 - 18 - BUILDING 123 DEMOLITION, LOOKING NORTH FROM THE ROOF OF BUILDING 460

4/28/98

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BLDG. - 123
CONTRACTOR - DENVER WEST REMEDIATION & CONSTRUCTION
#50581 - 09 - BUILDING 123 DEMOLITION, THE FIRST BITE
4/28/98

DESCRIPTION - ROCKY FLATS FIELD OFFICE
BLDG. - 123
CONTRACTOR - DENVER WEST REMEDIATION & CONSTRUCTION
#50563 - 05 - THE BACK SIDE OF ROOM 111s SOUTH WALL DURING SCABBLING OF CONTAMINATED PAINT FROM THE SOUTH WALL OF ROOM 111
4/23/98



DESCRIPTION - ROCKY FLATS FIELD OFFICE
BLDG. - 123
CONTRACTOR - DENVER WEST REMEDIATION & CONSTRUCTION
#50563 - 09 - A PLASTIC CONTAINMENT IS CONSTRUCTED TO SCABBLE CONTAMINATED PAINT FROM THE SOUTH WALL OF ROOM 111
4/23/98

Attachment 3

Performance Measure

RATING PLAN

97-C5.01R
Measure No.

SECTION I - PERFORMANCE OBJECTIVE, GOAL, AND RELATED INFORMATION

WBS Element No. 1.1.05.02.04	Maximum Available Incentive Fee Associated with this Measure: $ 521K		Original Issue ☒ or Revision No. : ATTACHMENT(S) ☐
ADS Element No. CP-1000	WAD No. 25	Related Commitments:	Fee Billings should reflect B&R Code No. EW0540000

Related Performance Objective:
Achieve immediate site condition for Industrial Zone

Related Performance Goal:
Remove 125/441 Cluster

SECTION II - PERFORMANCE MEASURE

Short Title: **Demolition of B123**

Brief, descriptive summary:

1. Complete decommissioning and demolition of Buildings 123 and 123S, and;
2. remove debris by February 10, 1998.

For Performance Metric, see Section V.

SECTION III - EARNINGS SCHEDULE, OR "CURVE"

Will Kaiser-Hill be entitled to incremental fee for partial accomplishment? If so, on what basis? Use tables or graphs, as appropriate.

1. 80% of PM fee may be earned for the completion of Buildings 123 and 123S demolition
2. 20% of PM fee may be earned for debris removal

SECTION IV - SIGNATURES

Kaiser-Hill Representative		Signature of Kaiser-Hill Representative	Date Signed 8/19/97
Responsible RFFO Mgr Initial	RFFO Manager Jessie Roberson	Signature of RFFO Manager Jessie Roberson	Date Signed 8/19/97

REVIEWED FOR CLASSIFICATION/UCNI By R.R. Riddle

RATING PLAN

97-C5.01R

Measure No.

SECTION V - PERFORMANCE REQUIREMENTS

What exactly demonstrates completion? Define the completion criteria exactly (e.g., acts, documentation, witnessing). Specific formula and definition of terms. Specify baseline documents. Ensure documents are available for verification at a later date.

1. Complete decommissioning and demolition of Buildings 123 and 123S by February 10, 1998.

- Buildings 123 and 123S structures have been demolished with no structural material remaining above the top of the slab by February 10, 1998.
- All pipes and conduit removed above the slab and capped appropriately with end caps of similar material . Capping shall be completed by February 10, 1998.
- All penetrations of the slab shall be sealed by February 10, 1998, to effectivly prevent water penetration until the slab is removed.

2. Remove debris by February 10, 1998.

- Debris has been removed from the building site by February 10, 1998.

DEFINITIONS

Demolished: Complete removal of building structure above the slab including piping, ventilation, and process waste lines. Capped pipes may protrude from the slab as noted below.

Capped: The end of the pipe closed with an end cap that completely seals the pipe. Protrusion of the cap above the slab shall not exceed 6 inches or the outside diameter of the pipe, whichever is larger.

Sealed: Direct Pathways (joints, penetrations) are covered or sealed with appropriate material to prevent water passage through the slab.

Debris removal: (1) free released material is recycled off-site consistent with waste minimization program guidance and/or shipped off-site for disposal in a permitted land fill, (2) waste determinations have been made to identify hazardous, low level radioactive, and mixed waste in accordance with 6 CCR 1007-3, 265.16 and the Rocky Flats Low-level Waste Management Plan (44-RWP/EWQA - 0014, Rev. 1), and; (3) hazardous, low level radioactive and low level mixed waste materials have been packaged and staged for disposal according to the Kaiser Hill Transportation Manual, TOC March 19, 1996.

Free release material: Material exhibiting radioactivity at levels less than the criteria established in DOE Order 5400.5 for protection of the public, and Radiological Requirements for Unrestricted Release of Property, Kaiser Hill 4-S23-ROI-03.02, Revision 0, May 8, 1995.

COMPLETION DOCUMENTATION: *(In addition to the Completion Report) The document(s) that should be submitted / data that should be available / actions to be taken by evaluator, to determine actual performance to the requirements stated above.*

1. For Demolition:
   - A demolition closure report for 123 and 123S confirming that demolition activities were completed by February 10, 1998, including completion of the following documents:
     - Reconnaissance Level Characterization Report
     - Health and Safety Plan
     - Under Building Contamination Sampling and Analysis Plan
     - Waste Management Plan
   - Documentation to confirm completion of the following activities in accordance with the K-H Project Management Manual (Chapter 5):
     - completion of a property disposal inventory
     - development of economic disposition plan(s)
     - completion of "readiness and removal activities".
     - proper storage and handling of unneeded property to maintain its fair market value as identified in the economic disposition plan above.
2. For Debris Removal:
   - The demolition closure report for 123 and 123S should also confirm that debris removal was completed by February 10, 1998.
   - Shipping manifests for solid waste disposed in off site land fills and/or recycled.
   - Documentation to confirm appropriate packaging & staging of hazardous, low level radioactive and low level mixed waste materials as verified WEMS.

ASSUMPTIONS *(Only if Needed) - E.g., Assumed schedules for necessary DOE or regulator reviews/approvals: (If assumptions are proven incorrect, schedule revisions may be in order)*

None

COMPLETION REPORT

97-C5.01R
Measure No.

SECTION I - PERIOD AND SUBMISSION INFORMATION

Performance Period Covered by this Report:	Maximum Available Incentive Fee Associated with this Measure:	
FY: 98 Quarter(s): 3rd	$521,000	Standard Measure ☒ Stretch Measure ☐ SuperStretch Measure ☐

Previous Payment Information: *List each Partial payment previously made against this Measure.*

Date: N/A Amt: Date: Amt:

1st Submission ☒ 4th Submission ☐
2nd Submission ☐ Correction to ____ ☐
3rd Submission ☐ Final Submission ☐

SECTION II - RESULTS

Brief description of actual accomplishments. Explain any variance with Rating Plan Section V completion criteria, completion documents, and assumptions.

Complete decommissioning and demolition of Buildings 123 and 123S and remove debris by February 10, 1998.

SECTION III - EARNINGS CALCULATION

Standard Measure: Enter the fee available (e.g., "all or nothing")
Stretch or SuperStretch Measure: Based upon the Results, above, calculate fee earned, using the Earnings Schedule from the Rating Plan.

1. 80% of PM fee may be earned for the completion of Buildings 123 and 123S demolition. ($416,800.00)
2. 20% of PM fee may be earned for debris removal. ($104,200.00)

TOTAL: $521,000.00

Earnings on this performance measure (PM) are linked to incomplete Gateway PM No. ____________ from a prior fiscal year.
There are known Category 1, 2, or 3 event(s) that may result in offset: ☐ Yes ☒ No *(if Yes, provide details)*

SECTION IV - DOCUMENTATION

List and attach the Completion Documents identified in the Rating Plan (explain any exceptions and variances).

Verification Documentation listed in the Rating Plan include: (See attached binder)
- Demolition Closure Report Summary (Section 1)
- Project Completion Documentation (Section 2)
- Reconnaissance Level Characterization Report (Section 3)
- Health and Safety Plan (Section 4)
- Under Building and Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123 (Section 5)
- Waste Management Plan (Section 6)
- Economic Disposition Plan and Property Disposal Information (Section 7)
- Completion of Environmental Readiness Evaluation (ERE) (Section 8)
- Summary of Waste Packaging and Documentation of Appropriate Packaging and Staging of Hazardous, Low Level Radioactive, and Low Level Mixed Waste (Section 9)
- Photographs (Section 10)

SECTION V - PREPARED AND SUBMITTED BY KAISER-HILL COMPANY, LLC

Name and Title of K-H Performing Manager	Signature of K-H Performing Manager	Date Signed
Alan Parker Vice President, Closure Projects Integration	Alan M Parker	7/1/98

SECTION VI - VALIDATION BY RFFO CONTRACTING OFFICER REPRESENTATIVE

COR is responsible for assuring the 2 statements in Section III are appropriately answered; coordinating, as appropriate, with other Direct Reports on this recommendation to the Contracting Officer; and for providing appropriate documentation and explanation in support of the position identified below.

☐ I concur fully with the Results and Earnings Calculation reflected above.
☐ I disagree totally with the Results shown and recommend denial of the claimed earnings.
☐ I acknowledge receipt of the Completion Report, but do not agree that the Measure has been completed and/or fee earned to the extent shown above.

Name and Title of DOE/RFFO COR	Signature of DOE/RFFO COR	Date Signed

Attachment 4

Proposed Action Memorandum

for the

Decommissioning of Building 123 (PAM)

This attachment includes the following:

1. Revision 6 of the PAM (dated March 1998); and

2. The last minor modification to this document (dated May 1998).

RFP-1325.02 (REV. 5/98)
Previously RF-46522

CORRES. CONTROL
INCOMING LTR NO.

00259 RF 98

DUE DATE
ACTION

Department of Energy

ROCKY FLATS FIELD OFFICE
P.O. BOX 928
GOLDEN, COLORADO 80402-0928

MAY 21 1998

MAY 98 21: 24

Attachment 4
RF/RMRS-98-253.UN

98-DOE-0372

DIST.	LTR	ENC
BACON, R.F.		
BENSUSSEN, S.J.		
BORMOLINI, A.M.		
BOYTER, N.C.		
BRAILSFORD, M.D		
BURDGE, L		
CARD, R.G.		
COSGROVE, M. M.		
COULTER, W.L.		
CRAWFORD, A.C.		
DERBY, S.		
DIETERLE, S.E.		
FERRERA, D.W.		
FERRERA, K.P.		
GERMAIN, A.L.		
GILPIN, H.E.		
HARDING, W.A.		
HARROUN, W.P.		
HEDAHL, T.G.		
HILL, J.A.		
MARTINEZ, L.A.		
NORTH, K.		
PARKER, A.	X	X
PHILLIPS, F.J.	X	X
RHOADES, D.W.		
RODGERS, A.D.		
RUSCITTO, D.G.		
SANDLIN, N.B.		
SHELTON, D.C.	X	X
SPEARS, M.S.		
TUOR, N.R.		
VOORHEIS, G.M.		
COR. CONTROL	X	X
ADMN. RECORD		
PATS/T130G		

Reviewed for Addressee
Corres. Control RFP

5/21/98 DK
Date By

Ref Ltr. #

DOE ORDER # 5400.1

Mr. Steve Gunderson
RFCA Project Coordinator
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80222-1530

Dear Mr. Gunderson:

Pursuant to Part 10, paragraph 126 of the Rocky Flats Cleanup Agreement (RFCA), this letter serves to notify the Lead Regulatory Agency of a minor modification to the Proposed Action Memorandum (PAM) for Building 123.

The 123 PAM as originally written describes a three phase program: demolition of the building; characterization of the soils in related Individual Hazardous Substance Sites (IHSS) 121 and 148; and remediation, if necessary, of the soils should any contamination be found in excess of soil action levels. We are modifying the work scope to delete the remediation phase from the PAM, deferring this activity to the environmental restoration program. Once the soils under and around the slab (IHSSs 121 and 148) have been characterized, we will use that information together with the information concerning the radiation contamination remaining in the slab to determine the relative rank of the Building 123 remediation in comparison to other environmental restoration remediation needs.

In addition, the Fiscal Year 1998 (FY98) RFCA Milestone (M8) reads "complete work described in PAM for Building 123 and 123S by 9/1/98." As we have previously agreed, the original italicized language is not part of the milestone; instead, completing the actions outlined in the PAM is the key element of compliance. As the modification will illustrate, these actions include building demolition and IHSS characterization.

The minor modification to the PAM consists of the changes described in the enclosure. Please call me with any questions or concerns you have regarding the FY98 RFCA milestone or the PAM modification

Sincerely,

R. R. Sarter
RFCA Coordinator

Enclosure

cc w/Enc:
T. Rehder. EPA
J. Legare, AMEC, RFFO
R. Tyler, ERWM, RFFO
W. Fitch, ERWM, RFFO
R. Disalvo, OCC, RFFO
S. Bell, OCC, RFFO
D. Shelton, K-H
A. Parker, K-H

CHANGE #1

Section 2.0 PROJECT DESCRIPTION

The project will facilitate the decommissioning efforts at Buildings 123, 113, 114, and 123S; ~~remediation~~ characterization of Individual Hazardous Substance Sites (IHSS) 121 and 148; partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40; and decontamination of radiologically-contaminated facility systems. Any subsurface contamination identified during the course of the project will be evaluated by ER subsequent to removal of Building 123 and is not considered to be part of the scope of this project. ~~The Building 123 slab and foundation will be removed as required to remediate any subsurface contamination as dictated by soil sampling results.~~ The PAM will thoroughly examine building removal activities, including relocation of the building tenants; removal of furniture, equipment, and excess chemicals; characterization of the building hazards and potential contamination; and removal of all asbestos-containing material (ACM).

This change was made to clarify that soil remediation was not part of the scope of this project. Characterization of under building contamination will be conducted at a sufficient level to allow this site to be added to the ER Ranking List.

CHANGE #2

SECTION 2.4.9 Metals

To support industrial hygiene efforts, samples were collected from selected painted surfaces in Building 123 and were analyzed for the following metals: lead; chromium; cadmium; and arsenic~~. to support industrial hygiene efforts~~. Site historical knowledge and recommendations by an accredited inspector were utilized in the sampling process. Twenty-one (21) samples were collected, and analysis was conducted using Atomic Absorption Spectroscopy by a third independent party. All paints indicated detectable levels of one or more of the metals. Representative samples were taken and analyzed ~~will be analyzed~~ using the Toxicity Characteristic Leaching Procedure (TCLP). ~~Should the TCLP analysis indicate the painted surfaces are leachable for heavy metals, they will be managed as hazardous waste. Otherwise,~~ Analysis indicate that although painted surfaces contain significant levels of heavy metals by total analysis, the metals are in a form that does not readily leach. None of the TCLP sampling conducted on paint samples in B123 indicated RCRA regulated levels of these metals. Therefore, painted surfaces of construction materials will be managed as RCRA non-hazardous solid waste. ~~standard construction debris.~~

This section was modified to clarify how painted surfaces containing heavy metals were characterized as non-hazardous.

CHANGE #6

SECTION 3.1.2.2

3.1.2.2 Soil Characterization

Soil characterization will include sampling and analysis of soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab ~~to determine need for soil remediation~~ and from the surrounding area. A SAP will be written to guide characterization activities in these areas. ~~The SAP will be finalized prior to the award of the decommissioning contract.~~ In accordance with paragraph 118 of the Rocky Flats Cleanup Agreement and the August 25, 1997 State of Colorado approval of the Building 123 PAM, the IHSS 148 SAP will be submitted to CDPHE for review and approval. The SAP will incorporate a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. ~~Sample location, depth and frequency will include recommendations from the RFETS Statistical Applications Group~~. Current planning indicates a need for ~~approximately fifty (50)~~ soil samples from beneath both the slab of Building 123 and from areas surrounding underground OPWLs. Sample~~s~~ locations will be designed ~~collected at depths immediately below the pipe~~ to locate ~~any~~ contamination that may have leaked from the ~~lines~~ OPWLs and the RCRA regulated underground waste process lines associated with Building 123. Samples will be analyzed for volatile organic compounds (VOCs), Target Analyte List (TAL) metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in *Guidance for the Data Quality Objective Process*, EPA QA/G-4 (EPA 1994).

The reasons for these modifications are:

- *To remove any linkage between the development and approval of the SAP and the awarding of the decommissioning contract. The SAP has to be approved by CDPHE as required by RFCA and the approval letter for the 123 PAM. There is no need for any further linkage; and*

- *Specific details of the SAP should not be incorporated into the PAM but left to the review and approval of CDPHE regarding that specific document. Therefore, specific details regarding the SAP have been removed.*

Best Available Copy

~~Remedial actions will be contingent upon compliance of sample analysis results with Tier II "action level" criteria defined in Appendix 6 of the RFCA. The extent of subsurface contamination will dictate the method of remediation. Areas in which soil sample results meet Tier II criteria will require no further action. Areas that exhibit radioactive or chemical contamination at levels in excess of RCRA regulatory levels will be excavated using conventional techniques and removed and disposed offsite as RCRA hazardous waste. Soil will be moved to a temporary staging area immediately adjacent to the site and placed in rolloff containers until proper disposition is determined. Contaminated soil will ultimately be disposed offsite as RCRA hazardous waste. At the completion of excavation activities, verification samples will be collected along the base and sides of the excavation(s) to determine post action condition of the subsurface soils. Samples will be analyzed according to the SAP. If analytical results indicate that contamination is present above Tier II Action Levels, further excavation and sampling will continue until the Tier II criteria are met.~~

This change was made to clarify that soil remediation was not part of the scope of this project. Characterization of under building contamination will be conducted at a sufficient level to allow this site to be added to the ER Ranking List.

CHANGE #9
SECTION 3.1.3.3
3.1.3.3 Evaluation of Process Waste Lines and Active Sumps ~~OPWL Remediation~~

RCRA Clean Closure of the active process waste lines and their associated sumps ~~Proper closure of active lines~~ will be contingent upon ~~rinsate and soil~~ sampling analyses ~~results.~~ Partial closure of RCRA Unit 40 will be conducted in accordance with Colorado Hazardous Waste Regulations (265, Subpart G) which requires a 30-day public comment period. Remedial and disposal options for partial closure of RCRA Unit 40 will be further defined in a separate closure plan. In the event that no contamination above Tier II action levels is found ~~is detected~~, no further closure work will be required except that underground active lines will be foamed and capped in place.. In the event that contamination above the Tier II action levels is detected, these portions of RCRA Unit 40 will either be deferred to ER for evaluation or the decontamination process as defined in the RCRA Closure Plan will be repeated.

Soil contamination associated with abandoned lines will be characterized to the extent that ER can use this information to rank the site and determine, what if any, remediation will take place.

~~Final D&D activities would include remediation of soil and underground piping beneath and surrounding the building slab. Remediation may include removal of contaminated soil, associated pipelines, and/or the concrete slab. Following proper remediation, the site would be regraded and seeded in an attempt to return the site to a natural state.~~

This change was made to clarify that soil remediation was not part of the scope of this project. Characterization of under building contamination will be conducted at a sufficient level to allow this site to be added to the ER Ranking List.

WASTE STREAM	PACKAGING AND ONSITE STORAGE	FINAL DISPOSITION	ESTIMATED GENERATION VOLUME
Hazardous waste rinsate (rad and non-rad) This waste stream will be generated during RCRA closure of part of RCRA Unit 40.	Process waste system.	Managed onsite in a wastewater treatment unit (building 374)	~~600 gallons~~ 7500 gallons
Mixed Wastes RAD Non-homogeneous Homogeneous	White 55 gallon drum 904A or Unit 14 or Unit 15A in Building 906	Non homogeneous LLMW does not have a designated disposal site at this time Homogeneous Oak Ridge LLM and LL solvents Envirocare, Utah	~~25 cu yds~~ ~~Envirocare can take solids and liquids (non organics) that can be solidified~~ Homogeneous 9 yd^3 Non-homogeneous ≤1yd^3
Low Level Waste plaster, wall materials, windows, panels, cement, etc.	White drum or white boxes or full size wooden crates complying with WO 1100 or WO 4034 B664 Cargo Containers or B440 Cargo Containers	Nevada Test Site	~~300 cu yds~~ 375 yd^3
Sanitary or Industrial Waste NON-RAD	Rolloffs either 20 or 30 yard roll offs	U.S.A. Waste, Erie, Colorado	~~150 cu yds~~ 3500 yd^3
PU&D materials and processed RCRA Scrap Metal destined for reclamation NON-RAD	Not regulated under RCRA [file systems, cabinets, shelves, desks, fumes hoods, muffler furnaces, lab benches, etc.]	Per PU&D; or Per RF contract	500 cu yds
Processed RCRA Scrap Metal destined for reclamation RAD	White box and/or container	No contract yet in place. Options include SEG and MSC. No shipments will be made until a contract is in place with a K-H approved vendor.	~~Characterization not complete, estimate unavailable.~~ ≤1yd^3

In the event a waste stream, not identified in this summary, is generated by this project and the waste stream has the potential of impacting human health or the environment, then RMRS or its subcontractor is required to immediately notify Kaiser-Hill's Environmental Compliance.

Best Available Copy

Attachment 1
CLG-014-98

Rocky Mountain
Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-012

PROPOSED ACTION MEMORANDUM FOR THE DECOMMISSIONING OF BUILDING 123

Rocky Mountain Remediation Services, L.L.C.

March 26, 1998

Revision 6

PROPOSED ACTION MEMORANDUM FOR THE DECOMMISSIONING OF BUILDING 123

REVISION 6

MARCH 26, 1998

This Proposed Action Memorandum has been reviewed and approved by:

Vern Guthrie
Vern Guthrie, Project Manager

4/6/98
Date

Ted A Hopkins
Ted Hopkins, Environmental Compliance Manager

4/6/98
Date

PROPOSED ACTION MEMORANDUM FOR THE DECOMMISSIONING OF BUILDING 123

TABLE OF CONTENTS

TABLE OF CONTENTS ii

ACRONYMS v

1.0 PURPOSE 1

2.0 PROJECT DESCRIPTION 1

2.1 BUILDING 123 PHYSICAL DESCRIPTION 1

2.2 123 CLUSTER GENERAL OPERATING HISTORY 4

2.2.1 Building 123 4
2.2.2 Building 113 6
2.2.3 Building 114 6
2.2.4 Building 123S 6

2.3 RCRA-DESIGNATED AREAS AND INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSS) 6

2.3.1 RCRA Unit 40 6
2.3.2 IHSS 121 7
2.3.3 IHSS 148 8

2.4 BUILDING HAZARD SUMMARY 8

2.4.1 Asbestos 9
2.4.2 Beryllium 11
2.4.3 Chemicals 11
2.4.4 RCRA Hazardous Wastes in Satellite Accumulation Areas (SAAs) 11
2.4.5 Perchloric Acid 12
2.4.6 Pressurized Gas Cylinders and Liquid Nitrogen 12
2.4.7 Polychlorinated Biphenyls (PCBs) 12
2.4.8 Radiologically-Contaminated Materials 12
2.4.9 Metals 13

3.0 PROJECT APPROACH AND OBJECTIVES 13

3.1 SCOPE 15

3.1.1 Planning and Engineering 15
3.1.2 Characterization 15
3.1.3 Remediation 18

3.2 WORKER HEALTH AND SAFETY 19

3.2.1 Personal Protective Equipment (PPE) 19
3.2.2 Ambient Air Monitoring 19

3.3 QUALITY ASSURANCE 20

3.4 WASTE MANAGEMENT 20

3.4.1 Non-Regulated Waste 21
3.4.2 Regulated Waste 21

4.0 ENVIRONMENTAL IMPACTS 21

4.1 PROPOSED ACTION AND ALTERNATIVES 21

4.1.1 Proposed Action 21
4.1.2 Alternative Actions 21

4.2 POTENTIAL ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION 22

4.2.1 Geology and Soils 22
4.2.2 Air Quality 23
4.2.3 Water Quality 23
4.2.4 Fauna and Flora 23
4.2.5 Human Health 23
4.2.6 Noise 23
4.2.7 Historical Resources 24
4.2.8 Visual Impacts 24
4.2.9 Cumulative Impacts 24

5.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS 24

5.1 CHEMICAL-SPECIFIC REQUIREMENTS AND CONSIDERATIONS 25

5.1.1 Airborne 25

5.2 ACTION-SPECIFIC REQUIREMENTS AND CONSIDERATIONS 27

5.2.1 Resource Conservation and Recovery Act (RCRA) 27
5.2.2 Toxic Substance Control Act (TSCA) 28
5.2.3 Colorado Low Level Waste Program 28

5.3 LOCATION-SPECIFIC REQUIREMENTS AND CONSIDERATIONS 28

5.4 TO BE CONSIDERED (TBC) 28

6.0 IMPLEMENTATION SCHEDULE 28

7.0 REFERENCES 28

FIGURES

2-1 Building 123 Site Plan 2
2-2 Building 123 Site Location 3
2-3 Building 123 Floor Plan 5

TABLES

2-4 Contaminants of Concern (COCs) 10
5-1 General List of Applicable or Relevant and Appropriate Requirements for Decommissioning and Demolition Activities at RFETS 26

APPENDICES

A-1—RCRA Applicable or Relevant and Appropriate Requirements (ARARs) A-1
B-1—Summary of Waste Management Plan for the Bldg. 123 D&D Project B-1

ATTACHMENTS

Attachment 1 Draft *Interagency Multi-Agency Radiological Site Survey and Site Investigation* Manual (MARSSIM) and Draft Nuclear Regulatory Commission (NRC) NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Termination*
Attachment 2 Level 1 Schedule for the Decommissioning and Demolition of Building 123

ACRONYMS

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
AQM	Air Quality Management
AHERA	Asbestos Hazard Emergency Response Act
ARAR	Applicable or Relevant and Appropriate Requirements
BRCS	Building Radiation Cleanup Standard
CAQCC	Colorado Air Quality Control Commission
CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and the Environment
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
COC	contaminants of concern
CWTF	Consolidated Water Treatment Facility
D&D	Decommissioning and Demolition
DDCP	dibutyl-n-n-diethyl carbamoyl phosphonate
DoD	Department of Defense
DOE	Department of Energy
ED	External Dosimetry
FIP	Facility Implementation Plan
GSA	General Services Administration
HPGe	high-purity germanium
HPI	Health Physics Instrumentation
HRR	Historical Release Report
HSP	Health and Safety Plan
HUD	US Department of Housing and Urban Development
HVAC	heating, ventilating and air conditioning
IH	Industrial Hygiene
IHSS	Individual Hazardous Substance Site
IRA	Interim Remedial Action
IWCP	Industrial Work Control Plan
LLM	low-level mixed waste
LLW	low-level waste
MARSSIM	Multi-Agency Radiological Site Survey and Site Investigation Manual
MCL	Maximum Contaminant Level
mrem	millirem
NCP	National Contingency Plan
NEPA	National Environmental Protection Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollution Discharge Elimination System
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
OPWL	Original Process Waste Line
OSHA	Occupational Safety and Health Administration
PAM	Proposed Action Memorandum
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PU&D	Property Utilization and Disposal
QA/QC	Quality Assurance/Quality Control

ACRONYMS (cont'd)

RAAMP	Radioactive Ambient Air Monitoring Program
RCA	Radiation Control Area
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RLCR	Reconnaissance Level Characterization Report
RLCS	Reconnaissance Level Characterization Survey
RMMA	Radioactive Material Management Area
RMRS	Rocky Mountain Remediation Services
RWP	Radiation Work Permit
SAA	Satellite Accumulation Area
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments Reauthorization Act
SHPO	State Historic Preservation Office
TAL	Target Analyte List
TBC	to-be-considered
TCLP	Toxicity Characteristic Leaching Procedure
TLD	thermoluminescent dosimeter
TSCA	Toxic Substance Control Act
TSDF	treatment, storage, and disposal facility
TU	Temporary Unit
UBC	Underground Building Contamination
VOC	volatile organic compound
WMP	Waste Management Plan
WSRIC	Waste Stream Residue Identification Characterization

1.0 PURPOSE

This Proposed Action Memorandum (PAM) outlines the approach and the applicable requirements that will be utilized in the decommissioning of Buildings 123, 114, 113, and 123S as part of the site cleanup of the Rocky Flats Environmental Technology Site (RFETS). The effort will be managed as a non-time critical Interim Remedial Action (IRA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), with respect to the RFETS Life Cycle Baseline (DOE 1996a).

Removal of the subject buildings will be conducted in accordance with the Rocky Flats Cleanup Agreement (RFCA, DOE 1996b) and the applicable or relevant and appropriate requirements (ARARs) of Federal, State, and local regulations. The regulatory requirements are implemented through RFETS policies and procedures. The action will be conducted in a manner that is protective of site workers, the public, and the environment.

2.0 PROJECT DESCRIPTION

The project will facilitate the decommissioning efforts at Buildings 123, 113, 114, and 123S; characterization of Individual Hazardous Substance Sites (IHSS) 121 and 148; partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40; and decontamination of radiologically-contaminated facility systems. Any subsurface contamination identified during the course of the project will be evaluated by ER subsequent to removal of Building 123 and is not considered to be part of the scope of this project. The PAM will thoroughly examine building removal activities, including relocation of the building tenants; removal of furniture, equipment, and excess chemicals; characterization of the building hazards and potential contamination; and removal of all asbestos-containing material (ACM).

2.1 BUILDING 123 PHYSICAL DESCRIPTION

The main structure in the 123 Cluster is Building 123, a bioassay laboratory and a dosimetry counting and distribution facility. Associated structures include Building 113, a medical records storage facility (which originally served as a guard shack); Building 114, a small outdoor shelter; and Building 123S, a metal storage unit for containerized waste. Building locations are indicated in Figure 2-1. This section describes the physical arrangement of principal buildings in the Building 123 Area, including architectural and structural features, significant equipment, environmental control systems and safety aspects of each building.

Building 123 is located on Central Avenue between Third and Fourth Streets (Figure 2-1). Figure 2-2 indicates the location of the building in relation to other RFETS facilities. The original building has been in use since construction in 1953, with additions completed in 1968, 1972, and 1974. The general areas of the building and respective approximate construction dates are:

East and North Wing (Rooms 100-135) - 1952
Addition to East Wing (Rooms 139-151) - 1968

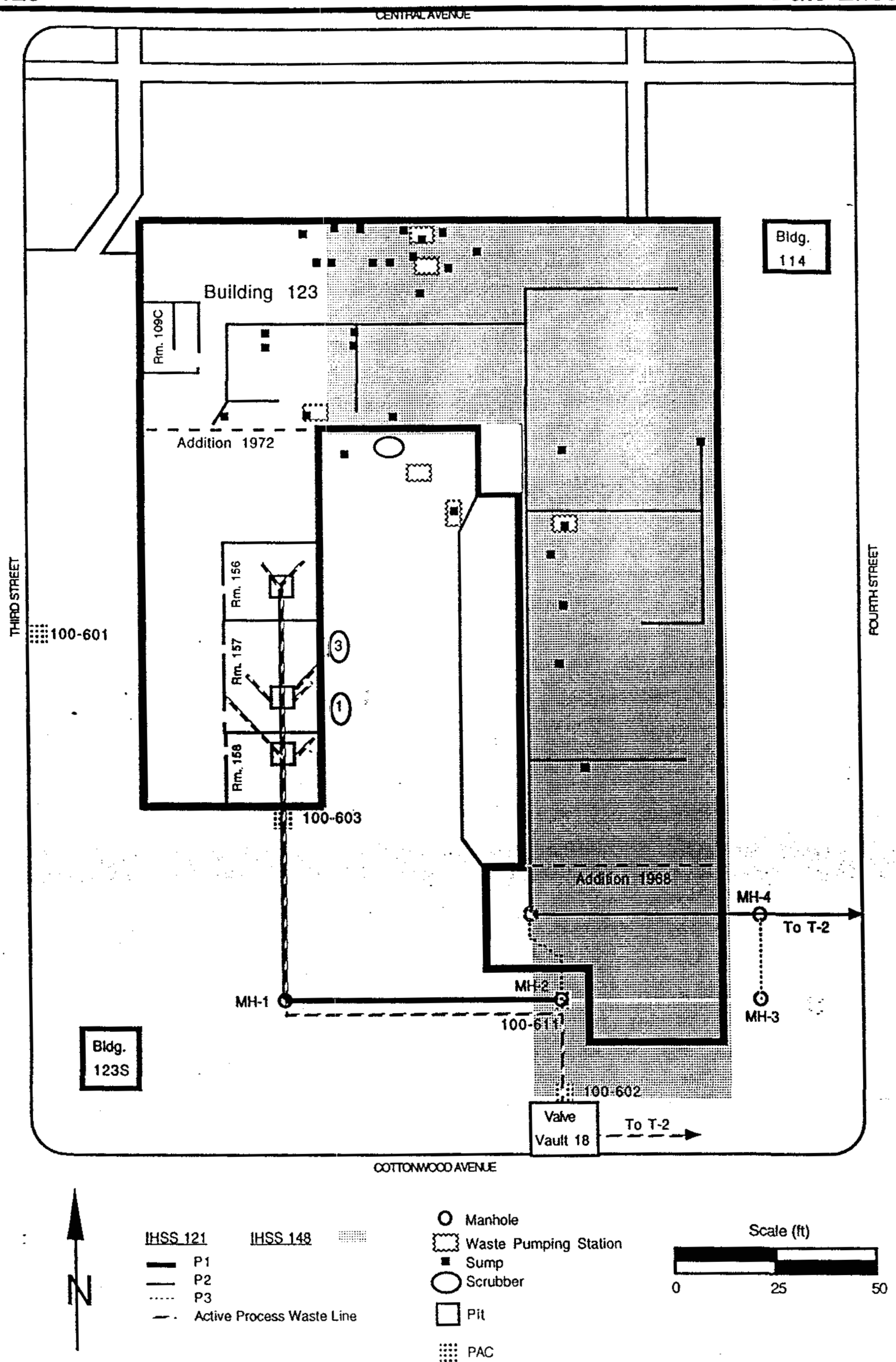


Figure 2-1 Building 123 Site Plan

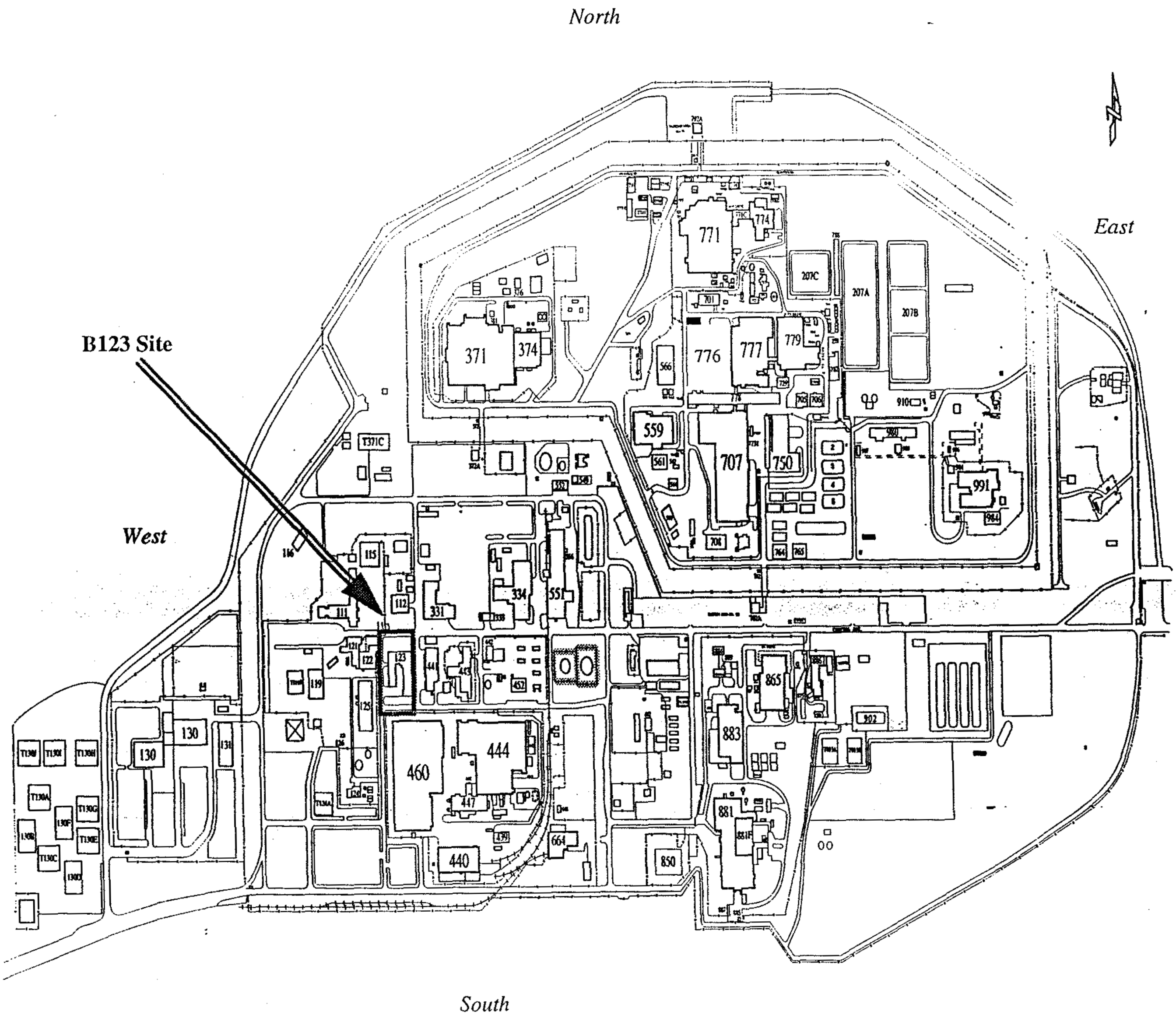


Figure 2-2 Building 123 Site Location

West Wing (Rooms 154-163) - 1972
Addition to East Wing (Room 165) - 1974

Currently, the 75-room, single-level facility covers approximately 19,000 square feet and is constructed on grade with approximately fourteen- (14-) foot ceilings. Construction material is mostly concrete with an asphalt roof. Modifications have been made to the building interior after the original construction of each area. Areas have been remodeled including installation and removal and partition walls, laboratory fixtures and other items. Sections of piping have been installed, removed and modified during the life of the facility. In addition, piping insulation in some areas has been replaced. Therefore, the possibility exists for a specific system, room or area to contain both ACM and non-ACM.

Heating, ventilating, and air conditioning (HVAC); electricity; gas and compressed air; steam; water; process waste; sewer; fuel oil; and fire protection utility systems serve the building.

2.2 123 CLUSTER GENERAL OPERATING HISTORY

2.2.1 Building 123

Building 123 was one of the first ten (10) buildings constructed at Rocky Flats. Analytical laboratory, dosimetry and instrument calibration activities have been conducted in Building 123 since construction in 1953. Building 123 also provides office space for radiation health specialists; storage for all radiological health records; a laboratory for calibration and repair of criticality alarms and other repair/calibration shops. Building 123 once housed medical research until such operations were relocated to Building 122. The Building 123 floor plan is indicated in Figure 2-3.

Operation of the analytical laboratory generates approximately 95 percent of the building waste and stores the majority of hazardous chemicals, with minor contributions from External Dosimetry (ED) and Health Physics Instrumentation (HPI) Sections. Historically, standard utility services have also generated small amounts of waste.

The analytical laboratory analyzes environmental (air, water, soil, and vegetation); biological (urine, fecal material, and nose swipes); health physics (room air); and industrial hygiene samples (beryllium and organic vapors in room air). The HPI Section repairs and calibrates radiation-detection instruments. The ED Section processes thermoluminescent dosimeters (TLDs) and film badges. The Radiological Records Section maintains occupational radiation exposure and dose records for radiation workers.

The analytical laboratory procedures involve the digestion of samples to purify and concentrate the radiological constituents. Sample preparation operations generated the bulk of the building waste. Combustibles, rubber gloves, and broken glass generated in the Radioactive Materials Management Areas (RMMAs) were placed in accumulation areas for eventual handling and removal as low-level waste (LLW). Various sample waste and rinse solutions were washed down the process drain for subsequent treatment in Building 774 (in Building 374 after 1983). Liquid organic wastes were containerized in special bottles and stored in satellite accumulation areas prior to transfer to the RCRA 90-day storage building and eventual shipment to Liquid Waste Operations.

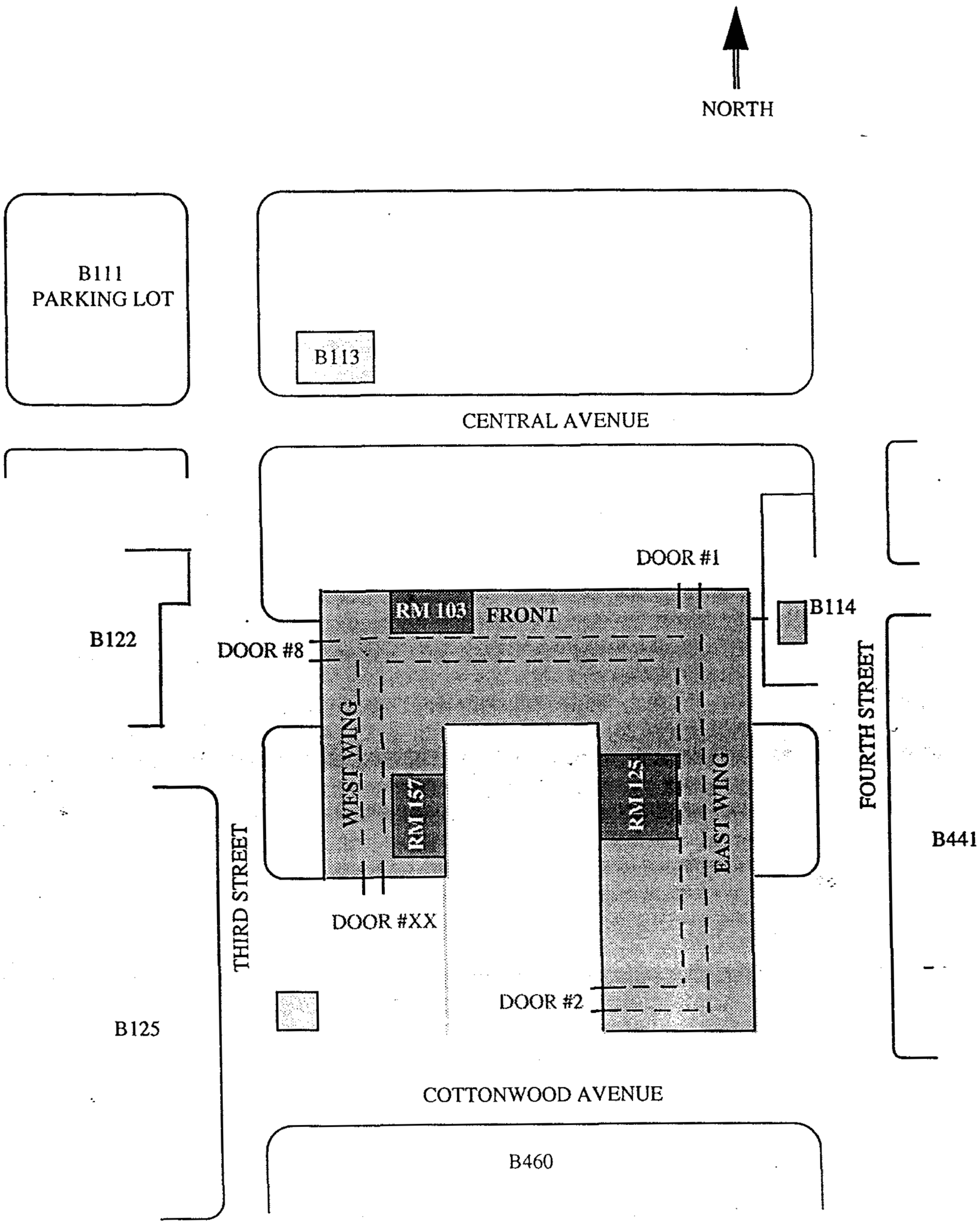


Figure 2-3 Building 123 Floor Plan

RCRA-regulated wastes were also collected in Satellite Accumulation Areas (SAAs), located in Rooms 103A, 124, 125, 127, and 156. Wastes generated in non-RMMAs and monitorable lab trash were deposited in dumpsters for disposal in the RFETS landfill.

Hazardous chemicals associated with Building 123 operations included in Section 2.4.

During the past forty-four (44) years, building operations have resulted in varying degrees of radioactive and chemical contamination within the building. For example, interviews with Building 123 occupants indicate that in the late 1960's or early 1970's, a small amount of cesium-contaminated liquid was spilled on the concrete floor in Room 109C. The floor was sealed to immobilize the contamination. Leaks or spills have also potentially contaminated the soil adjacent to and beneath the building (Section 2.3.1 through 2.3.3).

2.2.2 Building 113

Building 113 is a guardhouse that has been converted to office space (Figure 2-1). The building is constructed of concrete with a flat roof, and is similar to four other guardhouses that have already been removed from RFETS. No internal processes were located in the building.

2.2.3 Building 114

Building 114 is a small shelter used by RFETS employees as a waiting area for offsite transportation (Figure 2-1). The building encloses about 25 square feet and is constructed of masonry blocks with a flat roof. No utilities are associated with the building, and records indicate that the building has served no other function.

2.2.4 Building 123S

Building 123S is a metal shed upon a concrete slab (Figure 2-1). The shed encloses approximately 60 square feet and was formerly managed as a RCRA 90-day storage area for organic wastes including toluene and dibutyl-n-n-diethyl carbamoyl phosphonate (DDCP) wastes produced in Building 123 laboratories. The facility was formally closed as part of the RCRA process in 1996. Closure followed 6 CCR 1007-3, 262.34(a) and 6 CCR 1007-3, 265.111 and 265.114 requirements. No waste or other material is currently stored in the shed. No utility hookups exist in the building.

2.3 RCRA-DESIGNATED AREAS AND INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSS)

2.3.1 RCRA Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, the plant-wide process waste system, a network of tanks and underground and overhead pipelines constructed to transport and temporarily store process wastes from point of origin to on-site treatment and discharge points. RCRA Unit 40 includes all overhead and underground and process waste lines in and around Building 123. No other RCRA unit exists in the Building 123 area.

2.3.2 IHSS 121

The Building 123 area includes CERCLA-designated IHSS 121. IHSS 121 consists of RCRA Unit 40 underground OPWLs P-1, P-2, and P-3, which constitute former Operable Unit No. 9 (OU9). The pipelines were designated in the *Final Phase I RCRA Facility Investigation/ Remedial Investigation (RFI/RI) Work Plan for Operable Unit 9* (DOE 1992a).

All process waste generated from 1952 to 1968 was transferred from Building 123 to Building 441 through line P-2, which ran below the west side of the east wing before exiting at the southeast corner of the building. In 1968 the southeast wing was extended about fifty (50) feet to the south. Prior to the building addition, two manholes (MH-2 and MH-3) were constructed and the line was extended south to MH-2, then east to MH-3, and north to MH-4, before assuming the original path to the east. The extension was designated as P-3. One manhole was abandoned and covered by the building addition. In 1972 a west wing was constructed, extending south from the northwest corner of the original building. Prior to construction of the wing, line P-1 was installed to transfer waste to manhole MH-1, then east to a junction with P-3 at MH-2 (Figure 2.1). The lines transferred the following process waste from Building 123:

Acids: nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), and perchloric acid ($HClO_4$);
Bases: ammonium hydroxide (NH4OH) and sodium hydroxide (NaOH);
Solvents: acetone, alcohols, cyclohexane, toluene, xylenes, triisooctomine, and ether;
Radionuclides: various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm);
Metals: beryllium (Be) (trace amounts); and
Others: ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs).

In 1982 P-2 and P-3 were abandoned and plugged with cement. In 1989 the process waste transfer system was upgraded, including removal of the east-west section of P-1 between MH-2 and MH-3. The north-south section of P-1 between Building 123 and MH-1 was converted to the new process system. Three large, interconnected concrete sump pit areas were installed in Rooms 156, 157, and 158 to accommodate process waste system backup. Pipe was installed connecting MH-1 to Valve Vault 18 (Figure 2-1).

Currently, all process waste throughout Building 123 is collected in floor sumps. Each sump collects and temporarily stores liquid waste which is then pumped through overhead lines into a main floor sump in Room 158. The waste is then gravity-fed through P-1 to Valve Vault 18, then to Tank 428 at Building 441, and finally to Building 374 for treatment. Tank 428 will not be removed as part of this action as the tank is needed to service other RFETS building waste systems.

2.3.3 IHSS 148

IHSS 148 is part of former Operable Unit No. 13 (OU13) and is located beneath Building 123. IHSS 148 was designated in the *Final Phase I RFI/RI Work Plan for Operable Unit 13* (DOE 1992b) and has been identified as Underground Building Contamination (UBC) 123 in the RFETS Historical Release Report (HRR, DOE 1992c). IHSS 148 was established as a result of reported small spills of nitrate-bearing wastes along the east side of the building. Potential leaks in OPWL P-2 may have created contaminated soil beneath the building. A detailed characterization was conducted from September 1993 to February 1995 as part of a Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI). The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys.

Thirty-four (34) analytes were detected in the surface soil survey, including twenty-six (26) inorganic compounds and eight (8) radionuclides.

The soil-gas survey was conducted on a 25-foot grid in accordance with the work plan. Sixty-four (64) soil-gas locations were sampled during the survey. Thirteen (13) samples contained volatile organic compound (VOC) levels in excess of the 1 µg/ L method detection limit. Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the west and east wings of the building. Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2.6 µg/ L. Tetrachloroethene (PCE) was detected at 1.5 µg/ L in a sample collected to the east of Building 123. The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate. Analyses results indicate that subsurface infiltration precluded full evaporation.

The HRR also indicated a potential for soil contamination from sources other than Building 123 and associated OPWLs.

2.4 BUILDING HAZARD SUMMARY

Pursuant to RFCA criteria, a Reconnaissance-Level Characterization Survey (RLCS) was conducted to identify any hazardous and radioactive contaminants in the 123 Cluster. The survey identified no significant hazards associated with Buildings 113, 114 nor 123S, and indicated that the majority of Building 123 is considered to be "unaffected" (low potential for hazardous or radiological contamination) based on operational and process history. However, the following rooms in Building 123 were previously, or currently, posted as Radiation Control Areas (RCAs) or Radioactive Material Management Areas (RMMAs) and are therefore considered to be "affected" (potential for low-level contamination) and will require a more detailed survey prior to decommissioning: Rooms 103A, 105, 112, 123, 124, 125, 126, 127, 135, 149, 155A, 156, 157, 158, and 163.

In addition to radiological surveys, sampling and analysis efforts were conducted to determine the presence of beryllium, asbestos, lead, PCBs, and other potential contaminants. Hazardous chemicals associated with Building 123 operations included nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, ammonium thiocyanate, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate. Chemicals and waste materials are scheduled to be removed from the building prior to commencement of decommissioning activities. Potential hazards in the building are summarized in Table 2-4. These hazards were identified by a review of facility records and a visual survey of the building by project personnel, whom were assisted by building personnel familiar with the operational history of the facility.

The following potential hazards identified during the RLCS will be addressed during tenant relocation:

The liquid nitrogen system will be deactivated and associated pressurized cylinders will be removed from the building.

Laboratory chemicals will be removed from the building.

The following potential hazards identified during the RLCS will be addressed after tenant relocation, but prior to building demolition:

All ACM will be removed by a separate licensed contractor.
Fluorescent light ballasts will be evaluated for PCBs. Ballasts containing regulated levels of PCBs will be removed by the decommissioning contractor and packaged and shipped to a Toxic Substances Control Act (TCSA) regulated disposal facility by RFETS Waste Management.
Utilities and facility safety systems will be disconnected by Plant Power and Maintenance.
Material remaining in the building will be removed and properly managed.

2.4.1 Asbestos

Asbestos-containing materials (ACM) were inspected by a State-certified inspector the week of April 7, 1997. The inspection and evaluation was conducted in accordance with the guidelines specified in the Asbestos Hazard Emergency Response Act (AHERA) and in compliance with the US Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and State of Colorado asbestos inspection regulations. Abatement will be conducted by a contracted State-qualified abatement company.

A permit is required for asbestos abatement operations in accordance with Regulation 8, Control of Hazardous Air Pollutants, Part B, Section 3, (1)(a)(i); Notification will be made to the State of Colorado in accordance with Regulation 8, Part B, Section 3, (1)(a)(iii). A separate form for demolition is required for demolition in accordance with Regulation 8, Part B, Section 3, (3)(b)(i, ii, iii).

The following ACM sources and approximate volumes will be abated prior to commencement of decommissioning activities: thermal system insulation (900 linear feet); cementitious wallboard (3,450 square feet), drywall with tape and compound (4,000 square feet), resilient flooring (10,600 square feet), gray paper duct insulation (100 square feet), and mastic adhesive (40 square feet).

Table 2-4 Contaminants of Concern (COCs)

COC	Location	Implementation
Asbestos Containing Material (ACM)	Detected in floor and ceiling tiles; wall board; and as pipe insulation in most rooms.	To be remediated by a State-certified Asbestos Abatement Contractor. See Section 2.4.1
Beryllium	Present in Rooms 111 and 112	See Section 2.4.2.
Chemicals	Chemicals utilized in laboratory work have been identified.	All chemicals will be accumulated and removed from the building by the chemical handling group prior to commencement of decommissioning activities. See Section 2.4.3.
RCRA hazardous waste in Satellite Accumulation Areas (SAAs)	Present in Rooms 103A, 124, 125, 127, and 156.	Each waste stream will be managed according to associated waste components. See Section 2.4.4.
Perchloric acid fume hoods	Present in Rooms 157, 127, 112, and 105.	See Section 2.4.5.
Pressurized gas cylinders and liquid nitrogen	Present in laboratory areas.	See Section 2.4.6.
Polychlorinated biphenyls (PCBs)	Present in fluorescent light ballasts.	See Section 2.4.7.
Radiologically Contaminated Materials	Present in overhead piping, floor tiles in historical spill areas, on fume hoods, and laboratory counter tops.	See Section 2.4.8.
Metals (arsenic, cadmium, lead, lead-based paint, and silver)	Includes lead bricks and shielding; lead-based paint; lead and silver solder; nickel cadmium (NiCd) and lead acid batteries; and silver in photographic negatives.	See Section 2.4.9.

2.4.2 Beryllium

Thirty-nine (39) metal samples were collected by qualified beryllium sampling technicians from Rooms 111 and 112, laboratories that processed beryllium-contaminated samples as a function of site environmental soil sampling programs. The samples were submitted to an external analytical laboratory for analysis. Three (3) swipe samples taken in Rooms 123A, 111, and 112 indicated trace readings between 0.37 $\mu g/ft^2$ and 2.04 $\mu g/ft^2$ (RMRS 1997). All results were below the RFETS site housekeeping level of 25 $\mu g/ft^2$, a standard developed by the Atomic Energy Commission in approximately 1949 and adopted and used by RFETS since the 1960's.

Decommissioning of equipment contaminated with beryllium and subsequent free release of this equipment will be conducted in accordance with Kaiser-Hill and DOE guidance, policy and procedures.

2.4.3 Chemicals

Analytical chemicals currently associated with Building 123 operations are tracked by the RFETS Chemical Tracking Group under the "Right-to-Know" provisions of the Superfund Amendments Reauthorization Act (SARA) and are being managed by the laboratories. The chemicals will be removed immediately following termination of laboratory operations. Chemicals remaining in the building will be managed by the RFETS Chemical Tracking Group which will utilize or package chemicals for disposal. The current inventory of the building includes nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, ammonium thiocyanate, DDCP, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate.

2.4.4 RCRA Hazardous Waste in Satellite Accumulation Areas (SAAs)

Satellite Accumulation Areas (SAAs) were established in Rooms 103A, 124, 125, 127, and 156 to ensure proper storage of RCRA hazardous wastes near the point of generation. The SAAs are no longer active. The chemicals have been properly containerized, labeled and dispositioned.

Representative waste types that were accumulated in each area are summarized as follows:

Room 103A - Combustibles, waste isopropynol, DDCP/toluene
Room 124 - Liquid waste methanol, isopropynol
Room 125 - DDCP/toluene, isopropynol contaminated with toluene
Room 127 - Hydrochloric acid, hydrofluoric acid, ethanol
Room 156 - Combustibles, waste toluene/DDCP, isopropynol

2.4.5 Perchloric Acid

Perchloric acid hoods currently occupy four rooms [105, 112, 127 and 157(2 hoods)] within Building 123. Chronic use of perchloric acid may have caused the chemical to crystallize inside the hoods. The crystalline form may be sensitive to shock and could represent a potential physical hazard during decommissioning activities. To mitigate such a hazard, all hoods and duct work will be flushed and the rinsate directed to the Site process wastewater treatment plant in Building 374. Site Health and Safety have reviewed requirements for decontamination of perchloric acid hoods. The steps outlined in the requirements include interviews with laboratory personnel; building walkdowns, necessary repairs, and washdowns of all hoods and associated ductwork; and dismantlement of ductwork into easily managed sections. The requirements also define proper segregation and disposal of all solid duct material.

2.4.6 Pressurized Gas Cylinders and Liquid Nitrogen

Pressurized gas cylinders used by the laboratories will be removed by laboratory personnel during tenant relocation. The liquid nitrogen system will be disconnected and removed in conjunction with utility deactivation.

2.4.7 Polychlorinated Biphenyls (PCBs)

Potential exists for the presence of PCBs in fluorescent light ballast. Consequently, all light ballast will be evaluated for PCB contamination and properly segregated after the building has been vacated and lights are no longer required. All light ballast marked "PCB Free" or "No PCBs" will be managed as non-hazardous solid waste and disposed at a sanitary landfill. Ballast marked "PCBs" or not marked and not leaking will be packaged for disposal at an TSCA-permitted facility. Leaking PCB light ballast and unmarked leaking light ballast will be managed as fully-regulated PCB Articles.

In accordance with the Reconnaissance Level Characterization Plan, a walkthrough was conducted to evaluate the potential for PCBs in the 123 Cluster. Of particular concern, was the possible presence of PCBs in paint. A historical review regarding the use of PCB paints in industry and at DOE sites was conducted prior to the walkthrough. This review included interviewing representatives at Savanna River and PCB paint manufacturer. This data was used to delineate areas of concern during the walkthrough that would require sampling. One area was identified and sampled as a result of the walkthrough. The results were nondetect for PCBs. Based on Process Knowledge and supported by limited sampling data, there is no indication that PCBs are present in paints in the 123 Cluster.

2.4.8 Radiologically-Contaminated Materials

Radiological assessments have been conducted in Building 123 by RFETS Radiological Safety. Most of the following Radiological Material Management Areas (RMMAs) exist in laboratory hoods: Rooms/Labs 103A, 105, 112, 124, 125, 156, 157, and 163. RCAs exist in Room/Labs 103A, 105, 112, 123, 124, 125, 126, 127, 135, 149, 155A, 156, 157, 158, 163. Radiological sources are stored in 123, 126, and 155A. All RMMAs and RCAs are managed according to associated radiological characteristics.

Floor tiles removed from areas that exhibit noticeable signs of spill contamination or are suspect of contamination as a result of a known spill incident, will be treated as LLW. In the event that contaminated tiles cannot be scabbled from the foundation, entire floor sections which indicate evidence of spill contamination will be removed and treated as LLW.

2.4.9 Metals

To support industrial hygiene efforts, samples were collected from selected painted surfaces in Building 123 and were analyzed for the following metals: lead, chromium, cadmium, and arsenic. Site historical knowledge and recommendations by an accredited inspector were utilized in the sampling process. Twenty-one (21) samples were collected, and analysis was conducted using Atomic Absorption Spectroscopy by a third independent party. All paints indicated detectable levels of one or more of the metals. Representative samples were taken using the Toxicity Characteristic Leaching Procedure (TCLP). Analysis indicate that although painted surfaces contain significant levels of heavy metals by total analysis, the metals are in a form that does not readily leach. None of the TCLP sampling conducted on paint samples in B123 indicated RCRA regulated levels of these metals. Therefore, painted surfaces of construction materials will be managed as RCRA non-hazardous solid waste.

Lead bricks and shielding are located throughout the radiological areas to mitigate background radiation and protect personnel. The largest volume of lead is used to shield detectors and radiological sources. All lead or lead-bearing material will be removed by the source owners or dispositioned through the RFETS Property Utilization and Disposition Department.

3.0 PROJECT APPROACH AND OBJECTIVES

Building 123 will be decommissioned using a phased approach. A description of each of these phases and the activities that will be completed during each phase is provided below:

Phase I, Building 123 Strip-Out. The following tasks will be completed during Phase I:

- Limited asbestos abatement (for example cementitious cabinet and hood linings, mastic under a laboratory counter top).
- Removal of radioactively contaminated asbestos floor tile in Room 105, 109 and 109B.
- Removal of all carpet.
- Removal of process hoods and associated ducting, including a thorough rinse of the hood and ducting system, process waste system, and process scrubbbers for perchloric acid.
- Removal of laboratory cabinets, counter tops, and sinks.
- Removal of the process waste piping and ancillary equipment after completing a RCRA Closure rinse and rinsate analysis.
- Removal of ducting, piping, and other ancillary equipment for the process scrubbers and isolation of the scrubbers.
- Removal of other miscellaneous items such as fire protection equipment that will be salvaged for future use.
- Utility Isolation for Building 123 (power, water, communications, steam, natural gas, and plant air).

Phase II, Asbestos Abatement. The following asbestos containing materials will be abated during Phase II:

- Drywall mud, tape and joint compound.
- Floor tile.
- Cementitious wall, excluding the transite panels above the exterior windows.
- Pipe insulation for steam, condensate, domestic cold water, and domestic hot water. This shall include insulation of the steam lines entering Building 123 on the east side. Insulation shall be removed back to the main elevated steam/lines.
- Duct insulation on roof.
- Asbestos Containing Doors.

Phase III, Demolition of Building 113, 114, 123, and 123S. The following tasks will be conducted during Phase III:

- Removal of asbestos contaminated wall panels above exterior windows.
- Removal of miscellaneous materials (for example the lead/steel vault in Room 155, transformer in rooms 123A, 132, and 159, refrigerators, and process scrubbers).
- Utility isolation for Building 113.
- Demolition of Buildings 113, 114, 123, and 123S to the foundation slab.

Phase IV, Characterization of IHSS 121 and 148. This phase includes the following tasks:

- Sampling the building slab and surrounding soils according to the Sampling Analysis Plan.
- Sample analysis.
- Developing a final sampling report based on the results of the sampling.
- Submittal of final sampling report/analysis to ER.

The primary decommissioning objectives will be accomplished according to an integrated scope, schedule, and cost control system. All compliance documentation and project plans will be prepared and approved by RFETS Decommissioning and Demolition Management under a Project Execution Plan to ensure that decommissioning efforts are conducted in a safe and compliant manner.

All building utilities and associated facility safety systems will be disconnected prior to commencement of building demolition. The active process waste piping system in Building 123 (a component of RCRA Unit 40) will undergo closure according to the State approved RCRA Closure Plan. The building will be safely dismantled and the resulting debris and waste will be properly characterized and disposed at the appropriate offsite facilities. In addition, soil sampling beneath and adjacent to the building will be conducted using the methods described in a Sampling and Analysis Plan (SAP) prepared for this project. The SAP will be submitted to CDPHE at least 45 days prior to implementation. Characterization data from IHSS 121 and 148 will be provided to Environment Restoration (ER) Projects for evaluation and consideration for remediation. The outcome of this evaluation will be to adjust the ranking of these IHSSs, if necessary, in the ER Ranking List. Soil remediation, if necessary will be conducted by ER in compliance with RFCA Action Levels in a manner that is protective of human health and the environment. Soil remediation is not within the scope of this project.

The project will use standard industry practices, but will also incorporate lessons learned from previous demolition projects at RFETS and utilize personnel with expertise in decontamination and decommissioning activities.

3.1 SCOPE

Activities supporting the decommissioning effort have been divided into three general areas: (1) planning and engineering; (2) characterization; and (3) remediation. The scope includes removal of all internal piping, ventilation, and process waste systems. All rubble and materials removed during decommissioning activities are to be recycled or disposed at an appropriate offsite facility.

3.1.1 Planning and Engineering

Regulatory activities are completed as part of this action to ensure that the action is conducted in a manner consistent with the RFCA and regulations of the State of Colorado. Activities include assurance of public involvement and practical mitigation of environmental impacts. Planning objectives have been accomplished through project scoping meetings with CDPHE and EPA, and approval of the PAM document by the appropriate regulatory bodies and the general public. Other regulatory activities include General Services Administration (GSA) and Housing and Urban Development (HUD) notifications, establishment of the CERCLA administrative record, compliance with the Historic Preservation Act [including site programmatic consultation with the Colorado State Historic Preservation Office (SHPO) and the US National Park Service], and notification of asbestos abatement.

Specific planning documents include, a Reconnaissance-Level Characterization Report (RCLR), a Health and Safety Plan (HSP), a Waste Management Plan (WMP), an IHSS Sampling and Analysis Plan (SAP), and documentation detailing the programmatic consultation with the SHPO. Also, the SAP, Remediation Plan and RCRA Unit 40 Closure Plan will be submitted to CDPHE for review and approval prior to initiation of work governed by those documents. The documents will be provided to prospective decommissioning contractors as part of the project procurement package and will also be available to the general public upon request. A site visit will be conducted to facilitate preparation for demolition activities. A design package will be prepared for decommissioning activities which will define locations and configurations of active and inactive utility systems, summarize sample and analysis data, indicate as-built drawings, and present engineering estimates for building decommissioning.

3.1.2 Characterization

3.1.2.1 Building Characterization

Characterization activities associated with the decommissioning effort include survey of interior building surfaces. A final radiological characterization and survey for Building 123 will be performed in accordance with the decommissioning guideline in Interagency Multi-Agency Radiological Site Survey and Site Investigation Manual (MARSSIM) a draft decommissioning document developed by the Nuclear Regulatory Commission (NRC), Department of Defense (DoD), and the DOE in conjunction with Draft NRC NUREG/CR-5849, *Manual For Conducting Radiological Surveys In Support of License Termination.* Copies of the documents are included as Attachment A. The purpose of a final survey will be to verify that demolition rubble can be released to a commercial sanitary or demolition landfill. The survey will be completed following asbestos removal.

The methodology used to classify radiological areas of the building is described below:

Class 1 impacted areas exhibit or have demonstrated potential for radioactive contamination based on site operating history. Such areas may also indicate radioactive contamination that exceeds the applicable limits, based on previous radiological surveys. Typical Class 1 impacted areas have been remediated as a response to leaks and spills and include former disposal or burial sites, waste storage sites and areas with contaminants in discrete solid pieces of material that exhibit high specific activity.

Class 2 impacted areas exhibit or have demonstrated potential for radioactive contamination based on site operating history, but are not expected to exceed the applicable limits. Typical Class 2 areas include locations of unsealed radioactive material, potentially contaminated transport routes, upper walls and ceilings of buildings or rooms subjected to airborne contamination, areas downwind from stack release points, areas where low concentrations of radioactive material were handled, and perimeters of former contamination control areas.

Class 3 impacted areas are not expected to contain any radioactivity, or are expected to exhibit levels of residual radioactivity at a small fraction of the applicable limits, based on site operating history and previous radiation surveys. Examples of Class 3 areas include buffer areas around Class 1 and Class 2 areas and areas of very low potential for residual contamination.

Non-Impacted areas have no potential for residual radiological contamination.

Characterization/scoping surveys were used to determine the classification of each area in Building 123. Impacted areas required the performance of extensive radiological surveys based on requirements for Class 1, Class 2 or Class 3. Areas initially classified as Class 1, Class 2 or Class 3 impacted were reevaluated when initial characterization indicated that no radiological contamination exists above the applicable limits, based on potential radiological contamination from historical reviews versus actual contamination shown on previous surveys. A comprehensive, but less extensive survey was performed on all other building surfaces considered to be Class 2 or Class 3 impacted. The initial classification may be modified as additional in-process data are collected.

Class 1 impacted areas were divided into one-square-meter grids, and a minimum of one fixed and one removable contamination measurement for beta/gamma and alpha was obtained for each grid location. In addition, a 100% scan for beta/gamma and alpha was performed on all accessible surface areas. Class 2 impacted areas was divided into one-square-meter grids, and a minimum of one fixed and one removable contamination measurement for beta/gamma and alpha was obtained for each grid location. A 10% scan for beta/gamma and alpha was performed on all accessible surface areas. Class 3 impacted areas were surveyed at a minimum frequency of one fixed and one removable contamination measurement for beta/gamma and alpha for each nine square meters of accessible surface areas. In addition, 10% of all accessible surface areas were scanned for beta/gamma and alpha contamination.

Areas considered to be non-radioactive were classified as Class 3 impacted areas. Non-impacted areas will not require a radiological survey.

Areas that have been identified as Class 1 are Room 105 (ceiling not impacted) and the process waste sumps in Rooms 156, 157, and 158. Areas identified as Class 2 are 106, 109, 109A, 109B, and 123 (floors only); and Rooms 103, 103A, 111, 112, 124, 125, 127, 156, and 157 (ceilings not impacted). All remaining rooms and areas in Building 123 have been identified as Class 3. Buildings 113 and 114 are classified as non-impacted areas. Building 123S will be moved for reuse and was not classified.

All contaminated building surfaces, equipment and demolition materials will be managed according to waste type, with respect to Attachment 9.0 of RFCA. Following decontamination activities, the RFETS Building Radiation Cleanup Standard (BRCS) will be utilized to determine if residual radioactive constituents contained in remaining equipment and demolition debris is compliant with RFCA guidelines and appropriate as-low-as-reasonably-achievable (ALARA) considerations. The BRCS is currently under development in coordination with the EPA, CDPHE, and DOE. Until the BRCS is approved, more conservative criteria defined in DOE Order 5400.5 and associated RFETS radiation protection procedures will be used to determine if building surfaces, equipment and demolition debris are acceptable for unconditional release.

3.1.2.2 Soil Characterization

Soil characterization will include sampling and analysis of soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab and from the surrounding area. A SAP will be written to guide characterization activities in these areas. In accordance with Paragraph 118 of the Rocky Flats Cleanup Agreement and the August 25, 1997, State of Colorado approval of the Building 123 PAM, the IHSS 148 SAP will be submitted to CDHPE for review and approval. The SAP will incorporate a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. Current planning indicates a need for soil samples from beneath both the slab of Building 123 and from areas surrounding underground OPWLs. Sample locations will be designed to locate contamination that may have leaked from the OPWLs and the RCRA regulated underground waste process lines associated with Building 123. Samples will be analyzed for volatile organic compounds (VOCs), Target Analyte List (TAL) metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in *Guidance for the Data Quality Objective Process,* EPA QA/G-4 (EPA 1994).

3.1.2.3 OPWL Characterization

A plan for partial closure of RCRA Unit 40 will be written to characterize and manage all active OPWLs associated with Building 123, as all abandoned lines were properly decommissioned prior to implementation of RCRA regulations. Characterization will include flushing the active lines with decontamination solutions as identified in the approved RCRA Closure Plan for this unit in order to remove residues, then sampling the final rinsate for constituents. Soil sampling analysis of areas adjacent to abandoned OPWLs will be used to characterize and rank using the ER ranking system. The need for further remediation, if any, will be evaluated by ER.

3.1.3 Remediation

3.1.3.1 Building Removal

As part of the decommissioning process, all utilities and electrified systems will be disconnected and capped. The scope of the building decommissioning effort also includes removal of all interior piping, ventilation and above-slab waste systems. Demolition activities will be conducted in two primary phases. Initially, the hoods, laboratory counters, cabinets and radiologically contaminated floor tile will be removed from the laboratories. Removal will allow radiological surveys to be conducted on the walls of the laboratories before asbestos abatement. Hood ductwork and scrubbers will also be removed during this phase. Removal of the ductwork and scrubbers will eliminate a potential hazard (disruption of crystallized perchloric acid, see Section 2.4.5), prior to demolition of the structure. All building utilities will also be deactivated during this phase. Following removal of all asbestos from the building, a final radiological survey of the building will performed to verify that all building rubble can be disposed in an offsite landfill.

The second phase of demolition involves removal of the building superstructure, which will be removed using mechanical shears and front-end-type loaders. A crane will be utilized for removing large equipment and debris, and roof-based systems. Use of heavy equipment will minimize worker exposure to demolition hazards. Fugitive airborne emissions will be minimized with water sprays. The building will be surveyed for free release prior to demolition, and building rubble will be segregated and disposed at properly licensed facilities, depending on the type of waste stream created as a result of demolition activities. Friable asbestos will be disposed at Kettelman, California; non-friable asbestos and sanitary waste will be disposed at USA Waste, Erie, Colorado; LLW will be disposed at Nevada Test Site (NTS); Radioactive ACM will be disposed at Hanford Site, Washington; and low-level mixed waste (LLM) will be stored temporarily on site until an appropriate off-site facility is identified.

3.1.3.2 Soil Remediation

Soil remediation is not within the scope of this project. Sufficient soil sampling beneath the building slab and from the surrounding area will be taken in order to adequately characterize the IHSS 121 and 148 areas around B123. This information compiled in a sample report will be submitted to ER. ER will use this information to adjust the ER Ranking List, if necessary. The Ranking List will determine, what if any, soil remediation will be conducted at this location.

3.1.3.3 Evaluation of Process Waste Lines and Active Sumps

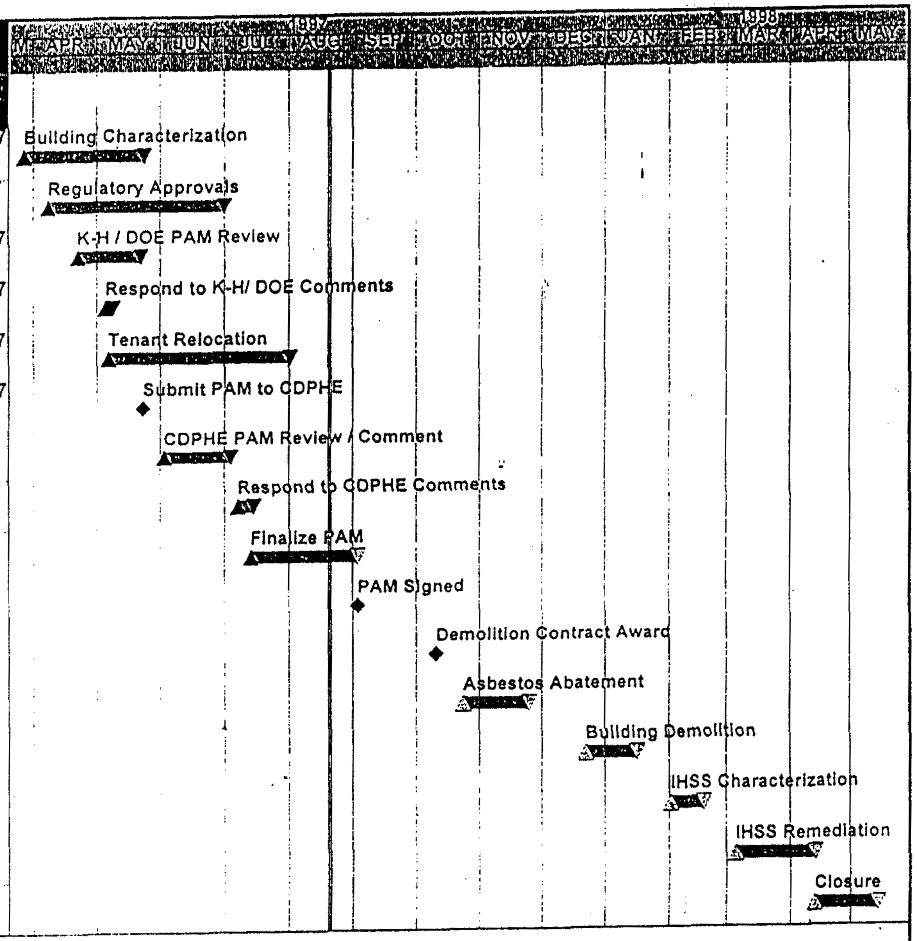
RCRA Clean Closure of the active process waste lines and associated sumps will be contingent upon sampling analyses. Partial closure of RCRA Unit 40 will be conducted in accordance with Colorado Hazardous Waste Regulations (265, Subpart G) which requires a 30-day public comment period. Remedial and disposal options for partial closure of RCRA Unit 40 will be further defined in a separate closure plan. In the event that no contamination above Tier II action levels is found, no further closure work will be required except that underground active lines will be foamed and capped in place. In the event that contamination above the Tier II action levels is detected, these portions of RCRA Unit 40 will be deferred to ER for evaluation or the decontamination process as defined in the RCRA Closure Plan will be repeated.

Soil contamination associated with abandoned lines will be characterized to the extent that ER can use this information to rank the site and determine, what if any, remediation will take place.

ATTACHMENT 2

LEVEL 1 SCHEDULE
FOR
THE DECONTAMINATION AND DECOMMISSIONING
OF
BUILDING 123

Activity Description	Orig Dur	Early Start	Early Finish	Actual Start	Actual Finish
Building [illegible]					
Life Cycle Activities					
Building Characterization	38*	27MAR97	23MAY97	27MAR97	23MAY97
Regulatory Approvals	53*	08APR97A	30JUN97A	08APR97	30JUN97
K-H / DOE PAM Review	25	22APR97A	21MAY97	22APR97	21MAY97
Respond to K-H/ DOE Comments	4	05MAY97A	08MAY97	05MAY97	08MAY97
Tenant Relocation	56*	07MAY97A	01AUG97	07MAY97	01AUG97
Submit PAM to CDPHE	0		22MAY97		22MAY97
CDPHE PAM Review / Comment	19	02JUN97A	03JUL97A	02JUN97	03JUL97
Respond to CDPHE Comments	32	07JUL97A	14JUL97A	07JUL97	14JUL97
Finalize PAM	32	14JUL97A	02SEP97	14JUL97	
PAM Signed	0		02SEP97		
Demolition Contract Award	0		10OCT97		
Asbestos Abatement	19	24OCT97*	24NOV97		
Building Demolition	16	22DEC97	15JAN98		
IHSS Characterization	12	02FEB98*	17FEB98		
IHSS Remediation	27*	06MAR98*	13APR98		
Closure	23	13APR98*	13MAY98		



Sheet 1 of 1

Project Start	20MAR97
Project Finish	26JAN98
Data Date	21AUG97
Run Date	21AUG97

© Primavera Systems, Inc.

Early Bar
Progress Bar
Critical Activity

LIFE

RMRS Rocky Mountain Remediation Services, L.L.C.

Best Available Copy

3.2 WORKER HEALTH AND SAFETY

The project will comply with OSHA construction standards for Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120. An HSP is being developed in accordance with this standard. The plan will address potential hazards of each phase of the decommissioning process and specify the requirements and procedures for personnel protection. DOE Order 5480.9A, *Construction Project Safety and Health Management*, will provide additional guidance for this project. The DOE order requires the preparation of Activity Hazard Analysis to identify each task and associated hazards, and the controls necessary to mitigate the hazards. The requirements will be integrated as appropriate. In the event of an unforeseen deviation from the planned approach, a second Activity Hazard Analysis will be prepared to address altered circumstances, and work will proceed according to the appropriate control measures. Data and controls will be continually evaluated. Radiological Work Permits will be generated for contaminated areas and will identify the location of potential surface contamination, define the appropriate PPE, and apply appropriate airborne radioactivity controls, if necessary. As required by 10 CFR 835, *Occupational Radiation Protection*, all applicable implementing procedures will be followed to insure protection of the workers.

3.2.1 Personal Protective Equipment (PPE)

Decommissioning activities may potentially expose workers to physical and chemical hazards and low levels of radiological activity. Physical hazards associated with decommissioning activities include: the use of heavy equipment, electrical shock, noise, heat stress, and work on elevated surfaces. Physical hazards will be mitigated by appropriate use of personal protective equipment (PPE); and application of pre-engineering evaluations, pre-evolutionary meetings, proper training, and administrative controls. Decommissioning activities which require dismantlement of radiologically contaminated systems will be conducted using Level C PPE. This level includes a full-face respirator, steel toe safety shoes, hard hat, anti-C Tyvek coveralls, gloves, disposable shoe covers, and hearing protection (if applicable). Decommissioning of uncontaminated systems or structures will be conducted using Level D PPE, which includes safety glasses or face shield, with neither a respirator nor Tyvek coveralls as described above.

Employee exposure evaluations conducted by an Industrial Hygiene (IH) Site Health and Safety Officer will determine PPE levels, which may change with conditions.

3.2.2 Ambient Air Monitoring

The existing Radioactive Ambient Air Monitoring Program (RAAMP) continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-one (31) samplers comprise the RAAMP network. Twelve (12) of these samplers are deployed at the Site perimeter and are used for confirmatory measurements of off-site impacts. The remainder are used as backup measures for determining local impacts from clean-up projects. Building 123 was not a plutonium, uranium or beryllium operations building, and based on results of radiological and beryllium surveys, the decontamination and demolition of Building 123 will not warrant special environmental monitoring. However, in response to a possible need for remediation of soil beneath the building slab with respect to soil sample analysis results, the project will operate a minimum of two low volume particulate samplers in the vicinity of the project site: One sampler will be located in the predominant upwind direction, and at least one sampler will be placed in the prevailing downwind direction. Specific sampler locations will be selected based on vehicular and pedestrian traffic patterns. Air Quality Management (AQM) will be consulted to select sampler locations. The samplers will be operated continuously during active decommissioning activities and will be changed weekly. AQM will reevaluate the configuration of the air monitoring network if project management surveillance of operations indicates a potential for significant increases in radionuclide emissions. Action levels associated with surveillance activities are defined in the Facility Implementation Plan (FIP). AQM will be appropriately notified when action levels are exceeded.

Water sprays will be used to minimize resuspension or fugitive dust emissions. In addition, earth-moving operations will not be conducted during periods of sustained high winds. If necessary, AQM will identify monitors within the existing ambient network located in the immediate area of Building 123, and the frequency of filter collection and filter analysis at those locations will be adjusted to provide timely information on the project emissions.

3.3 QUALITY ASSURANCE

A commitment to program quality and continuous improvement is applied at all levels from project start through completion. Adherence to the commitment is instrumental in the success of the project. All project personnel are responsible for following approved QA program requirements and participating in quality improvement activities.

Quality Assurance/Quality Control personnel are involved at the initial planning stages of the project, during site preparation, and during project execution. The QA organization assumes a proactive role during the project by identifying and/or preventing potential problems or shortcomings; offering solutions; and assisting in corrective action steps. QA personnel administer and perform duties in accordance with approved QA program requirements. The scope of the QA/QC program ensures:

- consistency and effective implementation of management/DOE directions and policies with other project/DOE requirements through audits and surveillances;
- assurance of document review and approval requirements through review of applicable procurement and work documents;
- validity of data gathering methodologies;
- compliance with standard operating procedures;
- integrity of waste packaging and incoming materials through inspections;
- facility characterization through performance of facility walkdowns;
- initiation of monitoring projects for potential improvements; and
- emplacement of corrective action initiatives.

3.4 WASTE MANAGEMENT

A Waste Management Plan will be developed for the project to define waste management activities. Estimates of waste volume indicate that decontamination, dismantlement, and decommissioning of Building 123 will generate less than 300 cubic yards (cu yd^3) of rubble. The waste will be designated as LLW, LLM, hazardous, or industrial waste and will be managed in accordance with State and Federal regulations by properly trained personnel. Waste Operations will arrange for transportation to an appropriate offsite facility. Manifests will be the responsibility of RFETS Traffic Department. Waste management training requirements are outlined in *Part IX Personnel Training of the Rocky Flats Environmental Technology Site RCRA Permit* (DOE 1997). The training matrix defined in Part IX details the training requirements for all personnel managing hazardous waste. Although the document is part of a permit, all RCRA training requirements of 6 CCR 1007-3, 265.16 are met.

3.4.1 Non-Regulated Waste

Release of non-contaminated materials, debris, and equipment from a site contaminated with hazardous constituents is accomplished by demonstrating that the materials or wastes do not exhibit any of the characteristics of hazardous waste as identified in Subpart C of 6 CCR 1007-3 SS261. Additionally, the material must not be qualified as a listed waste as identified in Subpart D, or be excluded under provisions in 6 CCR 1007-3 SS261.4, *Exclusions*. Non-contaminated recyclable materials, such as scrap metal, will be placed in approved waste crates and later segregated into bins supplied by Property Utilization and Disposal (PU&D). Additional items will be placed onto pallets for shipment to PU&D. All remaining non-regulated, standard industrial-type waste generated from decommissioning activities will be disposed at an off-site landfill.

3.4.2 Regulated Waste

Process knowledge and relative operating history will be used to manage contaminated areas apart from unaffected areas. Contaminated material will be segregated, categorized, and packaged according to the specifications for disposal in permitted hazardous waste, LLW, or LLM facilities. Waste characterization data and packaging requirements for LLW will meet the procedures and policies for managing LLW as outlined in the RFETS Low-Level Waste Management Plan. (Low Level Waste Management Plan 44-RWP /EWQA - 0014, Rev. 1, 1996). Waste Operations will designate temporary storage locations for LLW, LLM, or hazardous waste, as conditions warrant.

4.0 ENVIRONMENTAL IMPACTS

The National Environmental Policy Act (NEPA) requires that actions conducted at the RFETS consider potential impacts to the environment. While no separate NEPA documentation is required for this effort, RFCA requires DOE to consider environmental impacts of the proposed action and of alternatives as a part of this document.

4.1 PROPOSED ACTION AND ALTERNATIVES

4.1.1 Proposed Action

The proposed action is the Decommissioning and Demolition (D&D) of Building 123. D&D activities are to follow a project-specific plan approved by DOE and CDPHE. Activities would generally consist of site and facility characterization, decontamination, dismantlement and waste disposition. All hazardous, LLW and LLM generated by D&D activities would be transported to an appropriate offsite facility for disposal. The objective of the proposed action is to obtain from DOE and CDPHE a timely release of the site for unrestricted use.

D&D includes removing or decontaminating equipment, decontaminating building surfaces and structural members; surveying the facility for residual contamination; and characterizing, packing, and shipping the resulting wastes. Removal of residual contamination would be initiated with the simplest and least aggressive method, such as decontamination using vacuums and damp cloths. Increasingly aggressive techniques would be employed, as appropriate, to remove the remaining fixed contamination, including hand washing or scrubbing; dry abrasive blasting and scabbling; or scarification. New, innovative technologies will be considered if sufficiently developed and cost-effective.

Subsequent D&D activities would include application of fixatives to all contaminated surfaces to prevent the dispersion of contaminants during dismantlement. A survey would be performed to assure that all contaminants are fixed in place. The entire facility would be dismantled (with the exception of the building slab) and debris would be shipped to appropriate offsite facilities for disposal.

4.1.2 Alternative Actions

Alternative 1 to Proposed Action: No Action, Maintain Safe Shutdown Decontamination

The alternative would involve maintenance of Building 123 in a safe-shutdown status, including a commitment to long-term surveillance and upkeep, while performing a continued environmental monitoring program to ensure that contamination has not escaped to the environment. Regularly scheduled inspection and maintenance of health, safety, and radiation protection equipment would be performed and documented.

Alternative 2 to Proposed Action: Partial Facility Dismantlement with Minimal Decontamination

The alternative would involve minimal decontamination and demolition activities. All building equipment would be removed, including all hoods and overhead process waste lines. The remaining structure and surrounding area would be treated.

Evaluation of Alternatives

Both alternatives were rejected as operative actions, since such efforts would prevent proper cleanup of RFETS as specified under the Life Cycle Baseline. Maintenance and surveillance would need to increase with time as eventual degradation of the building structure would pose a threat to the public through chemical and physical hazards. Potential also exists for groundwater contamination through release of contaminants to the soil as the integrity of piping systems and sumps will eventually be compromised.

4.2 POTENTIAL ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Potential environmental effects associated with the D&D of Building 123 are described in the following sections.

4.2.1 Geology and Soils

Decommissioning activities will disturb less than one (1) acre of land, most of which has previously been disturbed. Activities such as excavating could cause localized soil slumping to occur. Soil recontouring will be conducted after buildings are removed. Potential effects will be short-term increases in soil erosion and siltation, and small, temporary losses in soil productivity. A commitment to complete appropriate revegetation will be initiated to mitigate any impacts caused by soil disturbance activities. All project areas not paved or already vegetated will be revegetated as directed by Site ecologists. Topsoil of sufficient quality will be used to support revegetation.

4.2.2 Air Quality

No continuing long-term air quality impacts are expected after the project has been completed. Short-term impacts will be mitigated by dust suppression techniques and excavation controls. The potential for release of small quantities of toxic, hazardous and/or radioactive contaminants will remain, though the potential health effects to workers and the public from such releases is expected to be negligible. Air quality impacts are further discussed in Section 5.1.1, and air monitoring criteria are defined in Section 3.2.2. Dust generated during the decommissioning effort will be managed with engineering controls.

4.2.3 Water Quality

Major surface water and groundwater quality impacts are not anticipated. The excavation area(s) will include run-on and run-off controls to prevent stormwater from contacting the wastes, and are not expected to intersect the groundwater table. Silt fences or similar barriers will be installed to prevent storm water runoff from carrying excavated soil from the project site. Removal of buildings and excavation of paved areas will result in a net decrease in storm water runoff from the Building 123 area and a corresponding increase in the amount of precipitation that percolates into the soil. Most of the local precipitation either evaporates on the ground surface or is taken up by vegetation. Surface water monitoring has been established at the Central Avenue ditch by RFETS Water Quality under a monitoring IRA.

4.2.4 Fauna and Flora

Building 123 is not located near any wetlands or habitat suitable for the threatened and endangered species. A migratory bird survey of the project site will be conducted by Site ecologists within two weeks of the beginning of field activities, and activities will not be initiated except in compliance with the Migratory Bird Species Act and as approved by Site ecologists. An attempt will be made to preserve the condition of four large trees along the north end of the site. Although no penalties exist for removing the trees, preservation will provide nesting areas for aviary species. If removal is necessary, the trees will be surveyed for nests by Site ecologists two weeks prior to destruction.

4.2.5 Human Health

Human health impacts will be maintained within applicable limits for worker protection, and requirements will be implemented to control the dispersion of contamination to air, water, and soil. Exposures to workers and the public will be controlled and monitored in accordance with standards defined in Section 5.0. Health effects to workers and the public are expected to be well within applicable limits, as operating procedures and other requirements will be implemented to protect human health.

Occupational safety impacts will also be mitigated according to applicable requirements. The Site *Cumulative Impacts Document* estimates a site-wide illness/injury rate of 13.6 per 200,000 hours worked in D&D activities.

4.2.6 Noise

Decommissioning activities will involve common industrial activities (e.g., wiping, disassembly, sawing and crushing) with a variety of associated noise levels. Many of the activities will be conducted within the building; thus, elevated noise levels will be muffled by the building structure.

Other, less common techniques such as scabbling, blasting and demolition by pneumatic hammer, wrecking ball, or other devices are expected to generate higher than ambient noise levels. Workers involved in such activities will use appropriate hearing protection devices. Outdoor activities will be conducted in a safe manner in which noise will not affect non-involved workers and the public.

4.2.7 Historical Resources

The programmatic agreement between the DOE Rocky Flats Field Office, the Colorado SHPO, and the Advisory Council on Historic Preservation has been approved. Building 113 is a guard post of the type denoted for documentation as a historical building. The documentation is under preparation and scheduled to be completed by September 30, 1997. Arrangements are being made to take streetscape photographs of Building 123 which has been designated as a Potentially Historic Structure. The terms of the agreement will be met before initiation of decommissioning activities.

4.2.8 Visual Impacts

Demolition of Building 123 and associated buildings will result in a flat, ground-level surface of pavement or revegetated soil where the buildings had previously stood. The appearance of surrounding areas will remain as industrial until additional buildings are demolished.

4.2.9 Cumulative Impacts

Decommissioning and demolition of the 123 Cluster comprises part of a broader program to decommission and demolish all but nine (9) of the approximately 700 buildings on the RFETS site. The cumulative effects of this program are described in detail in Section 5 of the *Cumulative Impacts Document.* In summary, such effects will result in a site with only nine (9) buildings, selected streets, a minor degree of infrastructure (water, sewer and electric service), and a large area of vacant land.

5.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

RFETS decommissioning actions performed under a PAM must attain, to the maximum extent practicable, Federal and State applicable or relevant and appropriate requirements (ARARs). ARARs associated with this document are a subset of the Federal and State requirements, which pertain directly to actions or conditions in the environment and are either applicable or relevant to particular decommissioning activities. D&D efforts performed according to the PAM must attain, to the maximum extent practicable, Federal and State ARARs.

Applicable requirements are cleanup standards; standards of control and other substantive environmental protection requirements; criteria; or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site.

Relevant and appropriate requirements are cleanup standards; standards of control and other substantive environmental protection requirements; criteria; or limitations promulgated under Federal or State law, that while not applicable to a pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, can sufficiently address problems or situations similar to those encountered at a CERCLA site.

ARARs associated with D&D projects include:

Chemical specific: quantitative health- or risk-based restrictions upon exposure to types of hazardous substances [e.g., drinking water standards as defined by Maximum Contaminant Levels (MCLs)];

Action specific: technology-based requirements for actions taken upon hazardous substances (incinerator standards that require particular destruction and removal efficiency); and

Location specific: restrictions upon activities in certain special locations (standards that prohibit certain types of facilities to operate in designated flood plain areas).

Table 5-1 is a general list of ARARs that are applicable for this project. A specific list is included as Attachment B.

5.1 CHEMICAL-SPECIFIC REQUIREMENTS AND CONSIDERATIONS

The project will encounter conditions regulated by the following chemical specific restrictions. The restrictions will be incorporated into the project planning effort and will be assured by following site procedures or by direct inclusion in the IWCP.

5.1.1 Airborne

The following Colorado Air Quality Control Commission (CAQCC) Regulations serve as applicable requirements:

- Reg. 8, Part A, (40 CFR Part 61) Subpart H regulates radionuclide emissions other than radon from DOE facilities and will apply to Building 123 if radiological contamination is discovered during characterization activities. 40 CFR 61.92 requires that no member of the public receive more than 10 mrem per year above background from airborne sources of radiation. Compliance with 40 CFR 61.92 is performed on a sitewide basis as a response to all RFETS sources, in which stack monitoring is required for all release points contributing greater than 0.1 mrem/year. Based upon preliminary estimates, monitoring will not be required. A formal analysis will be prepared.

- Reg. 8, Part B defines emission standards for asbestos.

- Reg. 8, Part C establishes an emission standard for lead in ambient air. The regulation states that no person shall cause or permit emissions of lead into the ambient air which would result in an ambient lead concentration exceeding 1.5 $\mu g/m^3$ averaged over a one-month period. The regulation will apply to any decommissioning activities with the potential to emit lead into the ambient air.

Table 5-1 General List of Applicable or Relevant and Appropriate Requirements for Decommissioning and Demolition Activities at RFETS

Requirement	Applicable	Relevant and Appropriate	TBC
DOE Order 5400.5, *Radiation Protection of the Public and Environment*	No	No	Yes
40 CFR 191, *Radioactive Dose Standards* (Spent Nuclear Fuel; High Level and Transuranic Radioactive Wastes)	NA	NA	NA
DOE Order 5820.2A, *Radioactive Waste Management*	No	No	Yes
6 CCR 1007-14, *Colorado Low Level Waste*	Yes	No	No
Colorado Air Quality Control Emission Standards for Asbestos Regulation 8, *Control of Hazardous Air Pollutants*	Yes	No	No
5 CCR 1001-14, *Ambient Air Quality Standards*	Yes	No	No
5 CCR 1001, *Colorado Air Pollution Regulations*	Yes	No	No
40 CFR 61, Subpart H, *National Emission Standards for Hazardous Air Pollutants*	Yes	No	No
5 CCR 1002-8, *Colorado Basic Standards and Methodologies for Surface Water*	NA	NA	NA
5 CCR 1002-8, *Colorado Basic Standards for Groundwater*	Yes	No	No
5 CCR 1003-1, 40 CFR 141, *Safe Drinking Water Act, Colorado Primary Drinking Water Regulations*	NA	NA	NA
40 CFR 141, *Maximum Contaminant Level Goals*	NA	NA	NA
Solid Waste Disposal Act, Colorado Hazardous Waste Act	Yes	No	No
Toxic Substance Control Act 15 USC 2601 *et seq.*			
761.40/761.45, *Labeling*	Yes	No	No
761.65, *Except for Time Limit*	Yes	No	No
761.66, *Time Limit*	NA	NA	NA
761.79, *Decontamination*	Yes	No	No
761.125, *PCB Spill Cleanup*	Yes	No	No

Emission Controls for Particles (5 CCR 1001-1) and *Emissions of Volatile Organic Compounds* (5 CCR 1001-9) may be applicable to soil excavation activities. Fugitive dust emissions controls are appropriate and relevant for the demolition. A list of hazardous air pollutant ARARs associated with this project is included in Attachment B.

5.2 ACTION-SPECIFIC REQUIREMENTS AND CONSIDERATIONS

The technology based standards and requirements are utilized when ever applicable or relevant and appropriate, to that specific action, to eliminate as many problem areas as possible. The project will encounter conditions regulated by the chemical specific restrictions identified in section 5.2.1 and Attachment B. The restrictions will be incorporated in this project planning effort and will be assured by following applicable RFETS procedures.

5.2.1 Resource Conservation and Recovery

Requirements governing the identification and characterization of hazardous wastes are defined in RCRA and are applicable to the requirements in the Colorado Hazardous Waste Act (CHWA) (6 CCR 1007-3, 261). The implementation of generator standards (6 CCR 1007-3 262) will be completed utilizing the Waste Stream Residue Identification Characterization (WSRIC) program and Waste Management Procedures. A list of specific RCRA ARARs associated with this project is included in Attachment B. The requirements governing Temporary Units (TUs) are applicable to tanks and containers used for storage and treatment of hazardous remediation wastes generated in conjunction with the D&D of B123. (See 40 CFR §264.553). All tanks and containers will be compatible with the waste and in good condition. Incompatible wastes, if encountered, will be segregated within the units. Secondary containment will be provided, where practicable, when liquid wastes are stored or treated in tanks or containers. Waste characterization will be provided, as appropriate, in accordance with the SAP. Inspections, at a minimum of once a week, will be provided during operations in accordance with the Waste Management Plan. Training for individuals generating and handling hazardous remediation waste will be implemented using the framework identified in the RFETS Part B permit. To close a TU, waste and contaminated soils will be removed, as appropriate.

Remediation wastewaters generated during D&D will be transferred to the Consolidated Water Treatment Facility (CWTF, Building 891) for treatment. Remediation wastewaters that contain listed RCRA hazardous wastes or exhibit a RCRA characteristic will not be subject to compliance with RCRA hazardous waste codes and would not be applicable or relevant and appropriate because the wastewaters are CERCLA remediation wastes being treated in a CERCLA treatment unit. The CWTF will treat the remediation wastewaters to meet applicable surface water quality standards under a National Pollution Discharge Elimination System (NPDES) ARARs framework.

Waste generated at B891 as the result of treatment of a listed remediation wastewater will be assigned the corresponding listed waste code. All wastes generated at B891 will be evaluated for hazardous characteristics.

5.2.2 Toxic Substance Control Act (TSCA)

The Toxic Substance Control Act (TSCA) defines criteria to guide management and disposal of PCBs. Fluorescent light ballast are the only potential source of PCBs identified in Building 123. Light ballast marked "No PCBs" or "PCB Free" will be managed as non-hazardous solid waste and disposed at a sanitary landfill. Ballast marked "PCBs" or not marked and not leaking will be packaged for disposal at an TSCA-permitted facility. Leaking PCB light ballast and unmarked light ballast will be managed as fully-regulated PCB Articles. A list of specific TSCA ARARs associated with this project is included in Attachment B.

5.2.3 Colorado Low Level Waste Program

The State of Colorado Low Level Waste Program (6 CCR 1007-14) is incorporated in Waste Management Operation procedures (1100-1104).

5.3 LOCATION-SPECIFIC REQUIREMENTS AND CONSIDERATIONS

No location specific requirements are associated with the scope of work.

5.4 TO-BE-CONSIDERED (TBC)

TBCs are used in determining the necessary level of cleanup for the protection of human health and the environment. The March 8, 1990 preamble to the final National Contingency Plan (NCP) rule (55 FR 8746) indicates that the use of TBCs is discretionary rather than mandatory; however, incorporation of TBCs is recommended and identified in this document.

6.0 IMPLEMENTATION SCHEDULE

The Level 1 schedule for this project is included as Attachment C. To meet requirements of the PAM process, the project will be completed in less than six months from commencement of contractor mobilization.

7.0 REFERENCES

DOE 1992a, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Original Process Waste Lines*, March.

DOE 1992b, *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area*, October.

DOE 1992c, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO.

DOE 1994, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Technical Memorandum No. 1, Volume IIA-Pipelines*, November.

DOE 1996a, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, July.

DOE 1996b, *RFETS Ten Year Plan.*

DOE 1997, *Part IX Personnel Training of the Rocky Flats Environmental Technology Site RCRA Permit*.

EPA 1994, *Guidance for the Data Quality Objective Process,* EPA, QA/G-4.

NRC 1997, *NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination,* Draft.

APPENDIX A

RCRA APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Chemical Specific Requirements and Considerations

Regulation 8 Control of Hazardous Air Pollutants

Citation*	Applicable	Relevant and Appropriate	TBC
Regulation 8 Control of Hazardous Air Pollutants (Sections involving with School requirements and State Buildings are not applicable.)	NA	NA	NA
Regulation No. 8 Part B, Part II, *Certification and Training*	No	No	Yes
General Requirements to Obtain a General Abatement Certificate	NA, administrative	NA	NA
Section II, *Initial Training*	No, worker safety issues are covered under OSHA and are not ARARs.	No	Yes
Section III, *Project Requirements*			
III B1, *Notification*	NA, administrative	NA	NA
C, *General Requirements Permits*	NA, administrative	NA	NA
C. 2, *Asbestos Abatement Work Practices*	NA, addressed through health and safety issues with exceptions	NA	NA
C.7.6, *Maximum Allowable Asbestos Levels*	Yes	No	No
C.8.2.b., d, f, *Handling Waste Material*	Yes	No	No
C.4, *Alternative Procedures and Variances*	NA, administrative	NA	NA
III, A(i) *Notice of Asbestos Removal*	NA, administrative	NA	NA
III *Asbestos Spill Response* (except as noted below):	No	No	Yes
III B.1, *Notices-Release triggers*	NA, administrative	NA	NA
III C., *Permit-Release triggers*	No	No	No
29 CFR 1910.134	No	No	No
29 CFR 1926.58, *Asbestos Construction Standard*	No	No	No
EPA Worker Protection Rule	No	No	No

Action Specific Requirements and Considerations

RCRA

Citation	Applicable	Relevant and Appropriate	TBC
40 CFR 261, *Identification and Listing of Hazardous Waste*	Yes	No	No
40 CFR 262, *Standards Applicable to Generators of Hazardous Waste*			
262.11, *Hazardous Waste Determinations*	Yes	No	No
262.12, *EPA ID Number*	No	No	No
262 Subpart B, *Manifest*	No	No	No
262 Subpart C, *Pre-Transportation Requirement*	Yes	No	No
262.34, *Accumulation Time* (with the following exceptions):	Yes	No	No
90-Day Storage Time Limit	No	No	No
Container Labeling	No	No	Yes
Container Dating	No	No	No
55 Gallon Limit for SAA	No	No	No
262.40 Subpart D, *Recordkeeping and Reporting*	No	No	No
262 Subpart E, *Exports of Hazardous Waste*	NA	NA	NA
262 Subpart F, *Imports of Hazardous Waste*	NA	NA	NA
262 Subpart H, *Transfrontier Shipments*	NA	NA	NA
40 CFR 263, *Standards Applicable to Transporters of Hazardous Wastes*			
263.11, *EPA Identification Number* (offsite shipments only)	Yes	No	No
263.12, *Transfer Facility* (offsite shipments only)	Yes	No	No
263 Subpart B, *Manifest System* (offsite shipment only)	Yes	No	No
263 Subpart C, *Hazardous Waste Discharges* (offsite shipments only)	Yes	No	No
40 CFR 264 Subpart S, *Corrective Action for Solid Waste Management Units*	Yes	No	No
264.553 Temporary Units - Containers	Yes, applicable to hazardous remediation waste	No	No
264.553 Temporary Units - Tanks	Yes, applicable to hazardous remediation waste	No	No

Action Specific Requirements and Considerations

RCRA (cont'd)

Citation	Applicable	Relevant and Appropriate	TBC
40 CFR 265, *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDFs)*			
265 Subpart A, *General*	No	No	No
265 Subpart B, *General Facility Standards*			
265.11, *Identification Number*	No	No	No
265.12, *Required Notices*	No	No	No
265.13, *General Waste Analysis*	NA	NA	NA
265.14, *Security*	NA	NA	NA
265.15, *General Inspection Requirements*	NA	NA	NA
265.16, *Personnel Training*	Yes, to individuals generating and handling hazardous waste	No	Yes
265.17, *General Requirements for Ignitable, Reactive, or Incompatible Wastes*	Yes	No	Yes
265.18, *Location Standards*	NA	NA	NA
265.19, *Construction Quality Assurance Program*	NA	NA	NA
265 Subpart C, *Preparedness and Prevention*			
265.31, *Maintenance and Operation of Facility*	Yes	No	No
265.32, *Required Equipment*	Yes	No	No
265.33, *Testing and Maintenance of Equipment*	Yes	No	No
265.34, *Access to communications or alarms*	Yes	No	No
265.35, *Required Aisle Space*	Yes	No	No
265.37, *Arrangements with local authorities* (a) (1)-(4)	Yes	No	No
(b)	No	No	No
265 Subpart D, *Contingency Plan and Emergency Procedures*	Yes	No	No
265 Subpart E, *Manifest System* (offsite shipments of hazardous waste)	Yes	No	No
265 Subpart F, *Groundwater Monitoring*	NA	NA	NA

Action Specific Requirements and Considerations

RCRA (cont'd)

Citation	Applicable	Relevant and Appropriate	TBC
265 Subpart G, *Closure and Post-Closure*	NA	NA	NA
265 Subpart I, *Use and Management of Containers* NOTE: Subpart S of 264 may replace this section of requirements.	Yes	No	No
265 Subpart J, *Tanks*, Part of an existing RCRA unit (tanks, sumps, piping and other ancillary equipment will be closed using a separate Closure Plan in accordance with 265 Subpart G. This unit will be closed under the 123 PAM.	NA	NA	NA
265 Subpart K, *Surface Impoundments*	NA	NA	NA
265 Subpart L, *Waste Piles*	NA	NA	NA
265 Subpart N, *Landfills*	NA	NA	NA
265 Subpart O, *Incinerators*	NA	NA	NA
265 Subpart P, *Thermal Treatment*	NA	NA	NA
265 Subpart Q, *Chemical, Physical and Biological Treatment*	NA	NA	NA
265 Subpart R, *Underground Injection*	NA	NA	NA
265 Subpart W, *Drip Pads*	NA	NA	NA
265 Subpart AA, *Air Emission Standards for Process Vents*	NA	NA	NA
265 Subpart BB, *Air Emission for Equipment Leaks*	NA	NA	NA
265 Subpart CC, *Air Emission Standards for Tanks, Surface Impoundments and Containers*	NA	No	No
265 Subpart AA, *Air Emission Standards for Process Vents*	NA	NA	NA
265 Subpart BB, *Air Emission for Equipment Leaks*	NA	NA	NA
265 Subpart CC, *Air Emission Standards for Tanks, Surface Impoundments and Containers*	NA	No	No
265 Subpart DD, *Containment Buildings*	NA	NA	NA
40 CFR 266 Subpart C, *Recyclable Materials Used in a Manner Constituting Disposal*	NA	NA	NA

Action Specific Requirements and Considerations

RCRA (cont'd)

Citation	Applicable	Relevant and Appropriate	TBC
266 Subpart F, *Recyclable Materials Utilized for Precious Metal Recovery*	NA	NA	NA
266 Subpart G, *Spent Lead Acid Batteries*	Yes	No	No
266 Subpart H, *Hazardous Waste Burned in Boilers and Industrial Furnaces*	NA	NA	NA
40 CFR 268, *Land Disposal Restrictions* (all sections regarding off-site shipment of wastes are applicable except for the following):	Yes	No	No
268.50, *One Year Storage Prohibition*	No	No	No
268.6, *Petitions to Allow Land Disposal of a Prohibited Waste*	No	No	No
268.44, *Variance from a Treatment Standard*	No	No	No
268.7(a)(4), *Waste Analysis Plan for Onsite Treatment*	No	No	No
268.9(a)(4), *One-Time Notifications of Onsite Treatment and Disposal of Characteristic Waste*	No	No	No
268.7(a)(5)(6) *One-Time Notice* (Onsite waste only)	No	No	No
40 CFR 270, *Hazardous Waste Permit*	NA	NA	NA
40 CFR 271, *State Authorization*	NA	NA	NA
40 CFR 273, *Universal Waste Management* (Batteries, pesticides and thermostats only)	Yes	No	No
40 CFR 279, *Used Oil Management Standards*			
279 Subpart C, *Used Oil Generators*	Yes	No	No
279 Subpart D-G	NA	NA	NA
279 Subpart H, *Standards for Used Oil Marketers*	Yes	No	No
279 Subpart I, *Dust Suppressant*	NA	NA	NA
40 CFR 280, *Underground Storage Tanks*	NA	NA	NA

Federal Requirements are identified except where State requirements are more stringent.

TSCA

Citation	TSCA Requirement	Applicable	Relevant and Appropriate	TBC
Ballast Marked "No PCB" or "PCB Free" (Both leaking and non-leaking)	None	NA	NA	NA
Non-Leaking Ballast Marked "Contains PCBs"	Disposal in a TSCA Incinerator (Small capacitor exclusion)	No	Yes, to final offsite management of this waste stream	Yes
Non-Leaking, Unmarked Ballast	Disposal in a TSCA Incinerator (Guidance from Region VIII)	No	No	Yes
Leaking Ballast Marked "Contains PCBs"	PCB Article 761 et. seq.	Yes	No	No
Leaking, Unmarked Ballast	PCB article fully TSCA regulated including any material that comes into direct contact with the leak	Yes	No	No

APPENDIX B

SUMMARY OF WASTE MANAGEMENT PLAN FOR THE BLDG. 123 D&D PROJECT

Estimated generation volumes incorporated into Building 123's Waste Management Plan (June 1997) may differ from those volumes used in this summary. Variations are due to completion of additional characterization and selection of waste management options.

WASTE STREAM	PACKAGING AND ONSITE STORAGE	FINAL DISPOSITION	ESTIMATED GENERATION VOLUME
ASBESTOS NON-RAD Friable Non-friable	Gray 55 gallon drums or strong tight boxes; friable 6 mm plastic double bagged; crate, roll-off; B666 or outside	Friable, Kettleman Hills through Chem Waste Contract Non-friable- U.S.A. Waste, Erie Co.	Friable: 120 yds^3 Non-friable: 90 yds^3
ASBESTOS RAD Friable Non-friable	White 55 gallon drums or boxes; 6 mm plastic double bagged or strong tight boxes/crates; B664 or B644 Cargo Containers	Nevada Test Site (NTS)	Friable: 170 yds^3 Non-friable: 130 yds^3
PCBs NON-RAD ballasts non-leaking	Black and yellow drum with a plastic liner Building 666	Chem Waste contract to Rollins Inc. at Deerpark, TX.	< 1 cu yd. This sum is a total of all PCB categories. Until the ballasts are removed, it is impossible to categorize this waste stream correctly.
PCBs NON-RAD leaking ballasts and all other regulated PCBs (articles, etc.)	Black and yellow drum with plastic liner; document on traveler if TSCA regulated. Building 666	Chem Waste contract to Rollins Inc. at Deerpark, TX.	Totaled in PCB NON-RAD category
PCBs RAD ballasts, non-leaking (LLW only, not TSCA regulated)	White drum with a plastic liner B666	Oak Ridge	Totaled in PCB NON-RAD category
Hazardous Waste NON-RAD fluorescent tubes Solvents, Paints, lead, chemicals, metals	Black and white drum tubes crushed on-site 123S or RCRA Unit 1	Chem Waste Contract	<1 cu yd
PCBs RAD Leaking ballasts and all other rad contaminated (LLW) and TSCA regulated wastes	White drum with a plastic liner B666	Oak Ridge	Totaled in PCB NON-RAD category

WASTE STREAM	PACKAGING AND ONSITE STORAGE	FINAL DISPOSITION	ESTIMATED GENERATION VOLUME
Hazardous waste rinsate (rad and non-rad) This waste stream will be generated during RCRA closure of part of RCRA Unit 40.	Process waste system,	Managed onsite in a wastewater treatment unit (building 374)	7500 gallons
Mixed Wastes RAD Non-homogeneous Homogeneous	White 55 gallon drum 904A or Unit 14 or Unit 15A in Building 906	Non homogeneous LLMW does not have a designated disposal site at this time Homogeneous Oak Ridge LLM and LL solvents Envirocare, Utah	Homogeneous: 9 yd^3 Non-homogeneous: <1 yd^3
Low Level Waste plaster, wall materials, windows, panels, cement, etc.	White drum or white boxes or full size wooden crates complying with WO 1100 or WO 4034 B664 Cargo Containers or B440 Cargo Containers	Nevada Test Site	375 yd^3
Sanitary or Industrial Waste NON-RAD	Roll-offs either 20 or 30 yard roll-offs	U.S.A. Waste, Erie, Colorado	3500 yd^3
PU&D materials and processed RCRA Scrap Metal destined for reclamation NON-RAD	Not regulated under RCRA [file systems, cabinets, shelves, desks, fumes hoods, muffler furnaces, lab benches, etc.]	Per PU&D; or Per RF contract	500 yd^3
Processed RCRA Scrap Metal destined for reclamation RAD	White box and/or container	No contract yet in place. Options include SEG and MSC. No shipments will be made until a contract is in place with a K-H approved vendor.	<1 yd^3

In the event a waste stream, not identified in this summary, is generated by this project and this wastes stream has the potential of impacting human health or the environment, then RMRS or its subcontractor is required to immediately notify Kaiser-Hill's Environmental Management and Compliance Division of the existence of this wastes stream. Jointly RMRS and Kaiser-Hill will determine the most appropriate management and disposal options for this waste stream.

ATTACHMENT 1

DRAFT INTERAGENCY MULTI-AGENCY RADIOLOGICAL SITE SURVEY AND SITE INVESTIGATION MANUAL (MARSSIM) AND DRAFT NUCLEAR REGULATORY COMMISSION (NRC) NUREG/CR-5849, *MANUAL FOR CONDUCTING RADIOLOGICAL SURVEYS IN SUPPORT OF LICENSE TERMINATION*

Attachment 5

Environmental Readiness Review Documentation

This attachment includes ERE documentation of the following:

I. Strip-Out

A. K-H authorization to proceed with Strip-Out.
B. DOE authorization to proceed with Strip-Out
C. Closure of Post-Start Findings for Strip-Out

II. Asbestos Abatement

A. K-H authorization to proceed with Asbestos Abatement
B. DOE authorization to proceed with Asbestos Abatement

III. Demolition

A. K-H authorization to proceed with Demolition of Buildings 113, 114 and the east wing of Building 123.
B. DOE authorization to proceed with Demolition of the west and north wings of Building 123.
C. Closure of Post-Start Findings for Demolition.

CORRES. CONTROL
OUTGOING LTR. NO.

DOE ORDER #.

97-RF 06120

DIST.	LTR	ENC
BENSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BUHL, TONY		
BURDGE, LARRY		
HARDING, WYNN		
CARD, BOB		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TILLER, ROBERT		
TUOR, NANCY		
VOORHEIS, GARY		
Crowe, Steve	X	X
Bruse, Jill	X	X
Buhl, Tony		
Daniels, Kevin		
Davis, Bob		
Gillen, Bill	X	X
Leonard, Eric		
Miles, Paul		
Miller, John	X	
Schmalz, Greg	X	
Steelman, Mark		
Walker-Lembke, S.	X	X
Hedahl, Tim		
Evans, Ben	X	
Rodgers, Alan		
[illegible] Dorr	X	X
Brian Bathgate	X	X
Tim Bitterfield	X	X
Brian North	X	X
Carol Patnoe	X	X
CORRES.CONTROL	X	X
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:
Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG & TYPIST INITIALS:
:rwa

RF-46469 (Rev. 3/97)

Attachment 5
RF/RMRS-98-253.UN

KAISER•HILL
COMPANY

November 18, 1997

97-RF-06120

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

AUTHORIZATION TO PROCEED WITH BUILDING 123 EQUIPMENT STRIPOUT - AMP-180-97

Refs: (a) K. A. Klein ltr, 05078, to A. M. Parker, Environmental Readiness Evaluation, June 30, 1997
(b) A. M. Parker ltr, AMP-122-97, to K. A. Klein, Building 123 Cluster Phased Environmental Readiness Evaluation Approach, August 28, 1997

In accordance with reference (a), Kaiser-Hill (K-H) is submitting written notification to the Office of the Assessment Manager for Environmental Compliance informing them that Rocky Mountain Remediation Services (RMRS) is ready to proceed with the equipment stripout phase of the Building 123 Decommissioning Project. As discussed in reference (b), Building 123 Cluster Phased Environmental Readiness Evaluation Approach, efforts for the Building 123 Decommissioning Project will be conducted in three phases: (1) equipment stripout, (2) asbestos abatement, and (3) demolition. It was decided that preliminary oversight efforts would focus on both the equipment stripout and asbestos abatement phases. However, as oversight progressed it became apparent that efforts should focus on each phase separately to aid in the prevention of delays. Therefore, to this point, only oversight of Building 123 equipment stripout was conducted. The oversight of the remaining two phases, asbestos abatement and demolition, will be conducted at a later date and DOE will be notified as appropriate.

Attached are the results of the K-H oversight of the Building 123 equipment stripout phase of the project. The overall conclusion of the review team was that the proper controls are in place to safely perform the activities. Field oversight of project control implementation will be conducted in a joint effort with the DOE ERE team just prior to the beginning of field work and oversight of the work performance will continue as the work progresses.

Also in accordance with reference (a), K-H is requesting written notification that the Building 123 project is authorized to commence equipment stripout.

If you have any questions on this matter, please contact Jill Bruse at Extension 4807/dp 6067.

Alan M. Parker

Alan M. Parker
Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

SJB:rwa

Attachment:
As Stated

cc:
Orig. and 1 cc - K. A. Klein

CLOSURE PROJECTS

ENGINEERING AND INTEGRATION

OVERSIGHT OF

B123
EQUIPMENT STRIPOUT
97-0148-KH

November 18, 1997

Sue Bruse

S. J. Bruse, Assessment Lead

Closure Project's Oversight of
B123
Equipment Stripout Phase

1.0 Summary

Kaiser-Hill's oversight of the Rocky Mountain Remediation Services (RMRS) Building 123 (B123) equipment stripout phase of the B123 decommissioning project was performed in October and November of 1997. The decommissioning of B123 will be conducted in three phases, as follows:

- Equipment stripout
- Asbestos abatement, and
- Demolition

The oversight summarized here focused on the first phase, equipment stripout. The second and third phases will be overseen separately, and will require separate authorization to proceed. The review team evaluated RMRS and subcontractor documentation prepared that defines and controls the work required, the training of on-site individuals responsible for the removal activities, and the overall readiness of RMRS and their subcontractors to perform the stripout activities.

It is determined that the proper controls are in place and the B123 equipment stripout phase of the project is ready to proceed. Activities will commence when work authorization notification is received from DOE.

Oversight of B123 project control implementation will be conducted in the field for equipment stripout requirements and will be conducted in concert with DOE. Particular areas for continuing field monitoring the includes:

- Management of waste of low level waste
- Training and qualification records and interviews
- RMRS Quality Assurance involvement
- Activity Hazard Analysis
- Asbestos Abatement Plan completion and State notification confirmation
- Waste chemical removal in room 158
- Pre-evolutionary briefing review including lessons learned and emergency procedures
- Perchloric rinsing procedure and operations

2.0 Introduction

K-H oversight consisted of an evaluation of the documentation prepared to define and control the project, the training of on-site individuals responsible for the removal activities, and the overall readiness to perform the activities. A review team was assembled to perform the evaluation. The team was comprised of the following personnel:

S. J. Bruse	Closure Projects Engineering and Integration
S. Bradfield	Health & Safety and Asbestos Abatement
W. F. Gillen	Radiological
K. North	Environmental Compliance
C. Patnoe	Air
G. D. Schmalz	Decontamination & Demolition and Fire Protection
S. M. Walker-Lembke	Authorization Basis

3.0 Review Method

The evaluation generally followed the guidance contained in DOE letter, Keith Klein to Alan Parker, AI:JG:05078, dated June 30, 1997, *Environmental Readiness Evaluation*. A checklist was used to ensure that appropriate areas were evaluated. The completed checklist used for the oversight efforts is contained as Attachment 1.

The evaluation included a review of the documentation prepared to support the project activities, interviews with project personnel and a review of on-site training plans and records. The two major areas, (1) Documentation review; and (2) Training and personnel readiness, are discussed below.

3.1 Project Documentation Review

The documentation reviewed addressed the activities and hazards expected to be encountered. Issues regarding documentation identified during the course of the assessment were corrected. Major documentation reviewed included but was not limited to:

- Project Execution Plan
- Proposed Action Memorandum
- Health and Safety Plans
- Waste Management Plan
- Lead Characterization Report
- Reconnaissance Level characterization Report
- Closure Plan for Building 123 Components of RCRA Unit 40
- Master Activity List Approval
- National Historic Preservation Act Documentation

- Asbestos Characterization Report
- N.E.P.A. Checklist
- Davis Bacon Determination
- Facility Safety Analysis
- Preliminary Hazard analysis
- Site Beryllium Characterization Report
- Integrated Work Control Package
- Subcontractor submittals

3.2 Training and Personnel Readiness

Denver West Remediation Contractors (DWRC) group training records for the employees utilized in the stripout activities of B123 will be verified prior to the start of work in the field. Rosters for required orientation, pre-evolutionary briefings, weekly safety meetings, and tool-box safety meetings will also be reviewed. Delaying the briefing and corresponding review is preferred since the briefings will not be occurring until just prior to the start of the field work and personnel are not currently on site.

3.3 Denver West Remediation Contractor

DWRC will be conducting the equipment stripout phase of the project. DWRC was deficient in implementation of the DWRC QA program. Implementation of corrective action has been verified by K-H QA and Project Management. Building 123 will be the model to ensure DWRC has effectively implemented the corrective action. Kaiser-Hill Quality Assurance (K-H QA) plans to conduct extensive oversight of DWRC's work practices and QA program implementation related to B123. K-H QA is responsible for assessing B123 progress with regard to implementation of the DWRC QA program. In addition to the normal level of involvement, Closure Projects will also assist K-H QA to accomplish this oversight task.

Attachment 1

B123 EQUIPMENT STRIPOUT CHECKLIST

PAGE 1
11/18/97

Item	CORE REQUIREMENTS	Supporting Documents	Results
1	Verify there are adequate and correct safety procedures. Verify safety limits for deactivation of the process systems and utility systems.	• Site Health and Safety Plan • Building 123 Demolition (HASP) • Preliminary Hazard Analysis • Hood and duct removal procedure Verification requirement: Review AHA as produced.	**Strip-Out:** Field oversight required— The procedures needed to safely perform this project are included in the Site Health and Safety Plan (HSP) or the Building 123 Demolition (HASP). The Preliminary Hazard Analysis (PHA) has been written for the project and is included in the HASP. A hood and duct work removal procedure has been written and reviewed for the project. Per contract specifications the project AHA's have not been developed at this time. The AHA will be submitted for approval prior to task implementation. **No work may proceed without approval of AHA.**
2	Verify compliance with environmental regulatory requirements such as regulations and regulator approved project documents.	• Proposed Action Memorandum (PAM) • Statement of Work for Strip-Out • Sampling Analysis Plan (SAP) • Project Execution Plan (PEP) • RCRA Closure Plan for 123 • Flushing of Fume Hoods • Administrative Record Verification requirement: Review asbestos abatement plan and documentation that State has been notified.	**Strip-Out:** Field oversight required—CDPH&E's review of the PAM required the development of a PEP which was done, a SAP which was done, the IHSS 148 Remediation Plan is TBD, the RCRA Closure for 123 which was done, the asbestos abatement plan and the demolition plan are TBD. • CDPH&E requires that the asbestos abatement plan be submitted to CDPH&E one week prior to implementation for review and the demolition plan be submitted at least two weeks prior to implementation for review and approval. Kent Dorr, K-H, has maintained communications with CDPHE and they are aware of the project status. **No asbestos abatement work can be done during the Strip-out phase until the Asbestos Abatement Plan is completed and submitted to CDPH&E one week prior to implementation.** • K-H reviewed the Administrative Record in early October and it is satisfactory.

Best Available Copy

B123 EQUIPMENT STRIPOUT CHECKLIST

11/18/97

Item	CORE REQUIREMENTS Checklist	Supporting Evidence	Results
3	Verify that any required Colorado Air Quality Control Commission Regulation No. 3 APEN (inventory reporting) documents have been submitted to the CDPHE, Air Pollution Control Division. (Note: If pollutant specific inventory thresholds are not tripped, APENs are not required.)	• C&PA-AQM letter No. CAP-101-97 addressing technical assessment of planned activities for *strip-out* and demolition of B123.	**Strip-Out**: Satisfactory—Review of information in technical assessment indicates that emission levels of non-radionuclide air pollutants do not exceed Air Pollutant Emission Notice (APEN) reporting thresholds and radionuclides do not exceed monitoring or approval thresholds.
4	Verify that the RFCA/CERCLA decision documents for decommissioning Building 123 include the assessment of radionuclide and non-radionuclide air pollutant emissions. Verify that the required RFCA decision documents include adequate information concerning potential air pollutant emissions and their impacts on public health and the environment for the regulators and the public to make informed decisions during the public comment process.	• PAM • C&PA/AQM technical assessment letter/CAP-101-97 • *Interview with personnel*	**Strip-Out**: Satisfactory—The PAM information indicates that potential air emissions of radionuclides, dust-particulate, lead, asbestos, and beryllium have been evaluated. Technical assessment letter indicates that all potential air pollutant emissions from strip-out are below Clear Air Act (CAA) reporting and monitoring thresholds (APENs are not required; and 40CFR61 reporting and monitoring are not required). Asbestos is identified as specific Applicable or Relevant Appropriate Requirements (ARARs) under the CAA for asbestos removal operations, dust-particulate is identified as specific ARAR under demolition, and radionuclides are identified as an issue for soil remediation. However, the strip-out phase should not generate these pollutants.
5	Verify that CAA related ARARS have been identified and project control documents provide for their implementation.	• PAM • SOW for the asbestos removal phase • Waste Management Plan • Bldg reconnaissance characterization plan	**Strip-Out**: Satisfactory—Asbestos, particulates and radionuclides are identified as ARARs for project. Asbestos and dust-particulate are not an issue for *strip-out phase*; potential radionuclide emissions are below CAA reporting and monitoring thresholds.
6	Verify that there is a contingency plan to address un-anticipated hazards that could generate air pollutant emissions and have an adverse impact on public health and the environment. Verify that Air Quality Management (AQM) has been appropriately included in the identified contingency plan	• PAM • Health and Safety Plan • Project Execution Plan (Rev 4)	**Strip-Out**: Marginal—None of the reviewed documents specifically indicates that Compliance and Performance Assurance (C&PA) Air Quality Management will be notified if an unanticipated finding or event occurs that adversely alters the original CAA assessment for this project. This probably will not occur during the strip-out phase but is likely to be an issue during demolition and soil remediation when air pollutants will be released to atmosphere and can affect the public.
7	Verify that the mitigation of fugitive dust emissions generated from demolition and decommissioning operations is addressed in a control plan specific for Building 123.	• SOW for the asbestos removal phase • Subcontractor asbestos abatement plans when received	**Strip-Out**: Not applicable to this phase of the project.

Best Available Copy

B123 EQUIPMENT STRIPOUT CHECKLIST

PAGE 3

11/18/97

Item	Checklist	Supporting Evidence	Results
8	Verify that the control of ozone depleting substances [chlorofluorocarbons (CFCs)] meets the recovery, inventory, and disposition requirements of CAQCC Regulation No. 15 and EPA 40 CFR 82. Verify that the redeployment of air conditioners or other appliances for reuse is documented and that AQM has been provided transfer information.	• Interview with Maintenance Operations, DynCorp	**Strip-Out:** Satisfactory—Some units have been redeployed, others have been warehoused for future use. All CFCs have been recovered from units that will be wasted.
9	Verify that the use of any fossil fuel-fired combustion equipment (i.e. generators) for alternate power support meets any applicable inventory reporting and permitting requirements of CAQCC Regulation No. 3.	• Interview with B123 RMRS Project Manager.	**Strip-Out:** Satisfactory—Diesel or gasoline fined engine use will be tracked. Project management will coordinate with AQM/Radian staff to ensure operations of units are compliant with CAQCC Reg No. 1 and 3 requirements.
10	Verify that there are no abandoned laboratory wastes/chemicals left in the building, in two flammable storage units located at the southwest corner outside of building 123, and in the cargo containers.	• Facility inspection <u>Verification requirements</u>: Written statement from project management, or existing documentation that contains that information, or appropriate authorized individuals written statement. Visual inspection.	**Strip-Out:** Satisfactory—All areas have been inspected for waste chemicals and no additional chemicals have been found. **Waste chemicals are stored in a 90 day area in Building 123 and must be removed prior to any strip-out work in the area (e.g., Room 158) being performed.**
11	Verify that the "perchlorate-issue" stemming from the multiple years of use of perchloric acid in building chemical hoods is appropriately addressed thorough utilization of experienced personnel and implementation of controls to prevent an industrial accident. [Perchlorates present a shock sensitive hazard (explosive reaction) and require expert removal. (RMRS detected perchlorates during building hazard characterization activities—at least one hood during the building characterization process.)]	• Review resume • Interview with personnel • Flushing of Fume Hoods for B123 Strip-out Project, Attachment 9.4 of IWCP	**Strip-Out:** Per Section 5.1.3 of the Flushing Fume Hoods, the HSS is required to submit documented experience in perchloric acid vent system removal.
12	Verify that waste streams which will be generated during decommissioning and demolition have been accurately identified. Verify that identified waste streams will be dispositioned to K-H list approved off-Site disposal facilities. Waste streams of concern: lead based paint, PCBs in paint and cables, liquids left in pipes, flush from pipes, piping, asbestos.	• B123 hazards characterization report. • Waste characterization report. • List of disposal facilities. • Subcontractor documents. • PAM • Flushing Procedure for Ducts/Hoods	**Strip-Out:** Satisfactory—Waste streams expected to be generated as part of the strip-out phase and management facilities are identified on waste management matrix table. **NOTE: The table must be updated for any new waste generated. Waste generated can only be managed at K-H approved facilities. K-H should be notified of any new waste streams generated.**

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B123 EQUIPMENT STRIPOUT CHECKLIST

Item	Checklist	Supporting Evidence	Results
13	Verify that modifications and additions to the Building 123 decision document (PAM) have been reviewed for adverse impacts to air quality.	• No modifications to the PAM have been submitted as of 11/10/97. • Interview with Ted Hopkins.	**Strip-Out:** Not applicable.
14	Verify that there is a contingency plan to address unknown hazards.	• HASP	**Strip-Out:** Field oversight required—Verification will be conducted in the field at pre-evolutionary briefing.
15	Verify that the NEPA checklist has been completed.	NEPA checklist	**Strip-Out:** *Satisfactory*—Documentation submitted to K-H prior to project commencement was adequate information to review the project.
16	Verify training and qualification programs for operation and operation support personnel have been established and documented. (Training and qualification program encompasses the range of duties and activities required to be performed.)	• Specification 1700 • HASP • Hood Removal Standard Operating Procedure • SOW	**Strip-Out:** Field oversight required— • Training requirements are identified in the 123 HASP, the Hood removal Standard Operating Procedure (SOP) and in the 02080 asbestos specification. • Qualification requirements for subcontractor supervisory positions such as project supervisor and health and safety professionals and other "competent persons" are established are established in the Statement of Work (SOW), Specification 01700 under General Subcontractor Supervisors, General Subcontractor Safety and Health Professionals, and Appendix 3, Supervisor/Designated Safety and Health Requirements. • **Training and qualification verification will be conducted in the field.**
17	Verify the level of knowledge of operations and operation support personnel is adequate based on interviews of personnel.	• Interviews of personnel will be conducted in the field.	**Strip-Out:** Field oversight required—Interviews will be conducted in the field.

Best Available Copy

B123 EQUIPMENT STRIPOUT CHECKLIST

11/18/97

Item	Checklist	Supporting Evidence	Results
18	Verify safety documentation is in place that describes the "safety envelope" of the project. The safety documentation should characterize the hazards/risks associated with the project and should identify mitigative measures that protect workers and the public from those hazards/risks. Safety system and system essential to worker and public safety are defined and a system to maintain control over the project.	• Preliminary Hazard Analysis (PHA) • Hood and Duct Removal • Work Control Package • DRS-077-97 dated 8/19/97 • RMRS HASP RF/RMRS-97-022#48, Rev. 0 6/97 • DWRC Safety and Health Plan for B123 Strip-out Project 10/97	**Strip-Out:** Satisfactory— • Hazard identification has been conducted through the asbestos, lead and radiological surveys. A Preliminary Hazard Analysis (PHA), located in the HASP, has been reviewed. A step by step procedure has been prepared in the Hood and Duct Removal Procedure. A work control package will also be utilized for this task and will contain Specific hold points in regard to clearances prior to any possible exposure to the general site population to verify the safety. • DRS-077-97 was a complete replacement for the previous hazard classification documentation. This second document was generated to address the concern raised regarding project controls credited in DRS-058. This Auditable Safety Analysis (ASA) also considered current versions of project documents and status. The project has been re-classified as Radiological. This is considered appropriate given the nature of the work. The controls credited to maintain the project hazard classification are expected to be adequate when implemented.
19	Verify a process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations, and the operating contractor.	• Comment resolution sheets • Status meetings	**Strip-Out:** Satisfactory— • Resolution of deficiencies are conducted through the formal design package review described in the Conduct of Engineering manual (COEM). • The project conducts weekly status meetings and project walkdowns.
20	Verify management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure operational support services are adequate for safe operations.	• IWCP for Strip-out Activities • Closure Plan - RCRA Unit 40 • RTG Perchloric Rinsate Procedure	**Strip-Out:** Field oversight required—Verification of radiological sampling of B123 sumps & handling of all rinsates will be conducted in the field.

Item	Checklist	Supporting Evidence	Results
21	Verify that functions, assignment, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented with line management responsibility of control of safety.	• HASP • PEP	**Strip-Out:** Satisfactory— • The project HASP section 2.0 clearly identifies functional roles and reporting responsibilities. The Project Execution Plan clearly identifies the reporting relationships within a section identified as "Key Projects Personnel Matrix", Table 7-1. This section specifically address the Health and Safety Officers responsibilities.
22	Verify a program is established to promote a site-wide culture in which personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and through their actions, demonstrate a high-priority commitment to comply with these requirements.	• RMRS Health and Safety Program (RF/RMRS-96-0065)	**Strip-Out:** Satisfactory— • RMRS's H&S Program (RF/RMRS-96-0065) describes a robust set of actions designed to promote a culture which places a high priority on awareness of safety and environmental protection. • RMRS is also actively engaged in the voluntary protection program (VPP).
23	Lessons learned form previous similar projects are adequately addressed.	• Lessons learned are reviewed by RMRS weekly at staff meetings. • Health and Safety utilized lessons learned in the development of procedures.	**Strip-Out:** Field oversight required—Sharing Lessons Learned verification will be conducted in the field.
OPTIONAL			
24	Verify that a systematic review of the facility's conformance to applicable DOE Orders has been performed, any nonconformance have been identified, and schedules for gaining compliance have been justified in writing and formally approved, or waivers granted.	• Environmental Readiness Checklist	**Strip-Out:** Satisfactory— • An environmental readiness checklist has recently been completed which lists plans and procedural requirements specified in the DOE orders. Examples requirement include: Project plans (DOE Order 4700.1) Characterization Plans (DOE Order5820.2A) Health and Safety Plans (29 CFR 1910.120).
25	Verify a routing and emergency contingency plan, including program record has been established and implemented.	• The site wide RFETS emergency operations plan is in effect for the entire site.	**Strip-Out:** Field oversight required—Verification that emergency procedures are reviewed will be conducted in the field.
26	Verify the technical and management qualifications of contractor personnel responsible for conduct of operations are adequate.	• DWRC Training Matrix	**Strip-Out:** Satisfactory—Sufficient training has been provided for the on-site management and craft performing strip-out activities.

Item	Checklist	Supporting Evidence	Results
27	**Verify a program is in place to confirm and periodically reconfirm the condition and operability of environmental monitoring system when present.** *All systems are currently operable and in satisfactory condition.*	N/A	**Strip-Out:** Environmental air monitoring is not required for the strip-out portion of the project. Notes: • ***K-H EMC* must be notified of any change to the scope or approach to the work so the need to environmental monitoring can be re-evaluated.** • **This element needs to be assessed for each phase of the project (an issue for future phases of the project).**
28	Verify all programs are in place to support certification from a waste repository. This includes having the programs in place, assay equipment certifiable, sampling and analysis program certifiable, quality assurance documents, and program in place, resources available all findings from previous audits and assessments closed out, and any other requirements of the waste repository in place and ready for certification.	• Off-site Waste Approval Facilities • Waste Certification Oversight Program	**Strip-Out:** Satisfactory—*The wastes identified to be generated during strip out are routine. As long as no additional waste streams are generated, approved programs are in place for Kettleman Hill, USA Waste, Nevada Test Site, and Hanford.*
ERE CHECKLIST			
29	Work planning documents/Basis of estimate correctly identified hazards and authorization basis	• Preliminary Hazard Analysis (PHA) • Hood and Duct Removal • Work Control Package	**Strip-Out:** Satisfactory—The project management requested appropriate review for authorization basis
30	A work Authorization Document developed and approved, including any required Baseline Change Proposals, which must be approved before work commences.	• Project Execution Plan • Interview with budget personnel	**Strip-Out:** Satisfactory— • *The Project Execution Plan (PEP) has been developed and includes items such as; project history, building descriptions, project budget and cost plan, project summary, justification, basis of estimate, key personnel, schedules and milestones and other project information.*
31	Funding approved and allocated.	• Budget documentation • Interview with budget personnel	**Strip-Out:** Satisfactory— • The funding for FY1998 is approved.

B123 EQUIPMENT STRIPOUT CHECKLIST

11/18/97

Item	Checklist	Supporting Evidence	Results
32	Characterization performed to determine extent of work.	• PAM • SAP • PEP • *Construction* Package • Flushing Procedures for Ducts and Hoods	**Strip-Out:** Satisfactory—Note: Any procedures or waste not previously identified in any of the project documents must be raised for review and approval.
33	Training contractor and *subcontractor field* personnel have documented *evidence* of required training.	A review of personnel training records will be conducted in the field. • Subcontractor submittals • Interview with K-H training personnel	**Strip-Out:** Field oversight required—Verification of training records will be conducted in the field.
34	Integrated Work Control program work package developed.	• IWCP for Strip-out Activities	**Strip-Out:** Field oversight required—IWCP been reviewed- field verification of controls for rinsate sampling & processing will be conducted in the field.
35	Proposed Action Memorandum (PAM) or equivalent approval by ER, K-H, DOE and EPA/CDPHE: *PAM outlines* the approach that will be taken and the applicable requirements	• PAM	**Strip-Out:** Satisfactory— • CDPH&E's review of the PAM required the development of a PEP which was done, a SAP which was done, the IHSS 148 Remediation Plan is TBD, the RCRA Closure *for 123 which* was done, the asbestos abatement plan and the demolition plan are TBD. • CDPH&E requires that the asbestos abatement plan be submitted to CDPH&E one week prior to *implementation* for review and the demolition plan be submitted at least two weeks prior to implementation for review and approval. Kent Dorr, K-H, has maintained communications with CDPHE and they *are aware of* the project status. **No asbestos abatement work can be done during the Strip-*out phase until the Asbestos Plan* is submitted to CDPH&E one week prior to implementation.** • K-H reviewed the Administrative Record *in early October* and it is satisfactory.
36	Development of Field Implementation Plan or equivalent: further defines the actions described in the PAM.	• PEP • Flushing Procedures for Ducts and Hoods • Construction Package for B123 Strip-out • SAP	**Strip-Out:** Satisfactory— • Although a Field Implementation Plan was not prepared for this project, the PEP and SAP meet the intent of the FIP for the strip-out portion of the project.

Item	Checklist	Supporting Evidence	Results
37	Health and Safety Plan written and approved: to address the safety and health hazards of each phase of site operation and specify the requirements and procedures for employee protection. *This may be incorporated into another document.*	• RMRS Health and Safety Plan • DWRC Health and Safety Plan	**Strip-Out:** Satisfactory— • The Health and Safety Plan for both RMRS and DWRC has been approved.
38	Sampling Analysis Plan (SAP) developed defines the criteria for sampling and analysis of material.	• Flushing of Fume Hoods (SAP) • Reconnaissance level characterization report	***Strip-Out:*** Satisfactory—Interviewed Ted Hopkins, Env. Mgr. for *the project.* Report currently being revised to address TSCA and other environmental concerns. Update is not required prior to project start up.
39	Verify radiological survey plans are determined and implemented. Verify that plans are developed from industry recognized standards.	• NUREG/CR-5849 "Manual for conducting Radiological surveys in support of License termination" • Radiation survey and Site Investigation Manual (MARSSIM) • RFETS survey plans and survey results summaries	**Strip-Out:** Field verification required—Field verification of the following radiological provisions is required: • Fume Hoods and laboratory countertops are analyzed for radioactivity before removal and dispositioned accordingly. • The material removed during strip-out is dispositioned according to its radioactive characteristics to include consideration of the radium issue. • Records or record summaries confirming radiological analyses of material removal during strip-out are promptly forwarded to the K-H oversight team.

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United States Government **Department of Energy**

memorandum

Rocky Flats Field Office

DATE: DEC 3 1997

REPLY TO ATTN OF: AI:SET:05572

SUBJECT: Approval to Proceed with Phase 1 of Building 123 Demolition, Equipment Stripout

TO: Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

Reference: Letter, A. Parker to K. Klein, 97-RF-06120 of Nov. 18, 1997, Authorization to Proceed with Building 123 Equipment Stripout

Your request to commence Building 123 Equipment Stripout is approved based on the completion of the Rocky Flats Field Office Environmental Readiness Evaluation (ERE) and your closure of the prestart findings. The ERE team will continue to monitor the project to ensure startup is smooth and that the post startup findings are closed.

Keith A. Klein
Deputy Manager for Technical Programs

Attachments

cc w/Att:
E. Kray, CDPHE
R. Warther, DNFSB
T. Weadock, EH-24
J. Legare, AMEC, RFFO
M. Weis, AMPA, RFFO
D. Lowe, AME, RFFO
S. Tower, AI, RFFO

Date: December 1, 1997

Assessment ID Number: 97-047-AI-CERCLA Building 123 Equipment Stripout ERE

Purpose: To assess the readiness of the Integrating Management Contractor to proceed with work in Building 123 for the first phase of the demolition, equipment stripout.

Executive Summary: The cooperation of the assessed personnel and their attitude concerning this assessment was positive and commendable. In general, the demolition team was well prepared to proceed with work in the field with 5 exceptions noted as prestart findings below. It is necessary to correct these 5 deficiencies to DOE satisfaction prior to start of the work. There are also 9 other findings which must be corrected but not prior to starting work.

Conduct of Assessment: The RFFO assessment was conducted over a week period from 20 through 26 November 1997 by the seven member team who signed below. The assessment was conducted in accord with the Assessment Program Operating Procedure and the Assistant Manger for Environmental Compliance Addendum to the Assessment Procedure for Environmental Readiness Evaluations. The building was visited by the whole team at various times, interviews were conducted informally, and a large number of documents were reviewed. Additional detail is provided in the attached team member observation forms. Note that substantial changes were made to the category of findings in the observation form covering radiological protection in this final report.

The result of the assessment.
Findings:

Prestart Findings (must be corrected to DOE satisfaction prior to start of work):

- Specific RWP 97-123-0003 & RWP 97-123-0005:
    - RCAs allowed on the RWP are RMAs and CAs only, however, the suspension limits are 150,000 dpm/100cm2 beta/gamma removable and 50 DAC (150,000 dpm/100cm2 beta/gamma removable exceeds CA limits and 50 DAC would be an ARA).
- RWP 97-123-0007
    - RCAs allowed on the RWP are HCAs only, however, the suspension limits are 2000 dpm/100cm2 alpha and 150,000 dpm/100cm2 beta/gamma removable (2000 dpm/100cm2 alpha removable is the low end of the HCA limit, and 150,000 dpm/100cm2 beta/gamma removable is not a CA or HCA limit).
    - No double PPE required as per Site RCM for work in an HCA.
- Section 4.4 Hazard Analysis (AHAs/JSAs) of the Safety and Health Program identifies several specific steps to be taken when developing the hazard

analysis. Section 1.1 Scope and Applicability of the Building 123 Decommissioning Health and Safety Plan states "The AHA will identify the principal steps involved and the sequence of work activities, the potential safety and health hazards associated with each step, the specific controls associated with each potential hazard, the task specific special equipment to be used in performing the activity, and monitoring requirements." Section 1.6 Health and Safety Plan Development prescribes that the AHA will include "Actual corrective measures planned to control or mitigate identified hazards." The AHAs do not meet these requirements, particularly the requirements to develop controls for the identified hazards. The concurrence of the job supervisor and the safety and health representative raises concerns regarding appropriate review. A comprehensive review of specific safety and health hazards, the analysis conducted to identify the specific hazards, and control measures to mitigate these hazards will need to be performed prior to project initiation.

- Training records were found demonstrating completion of the required training as outlined in both the Statement of Work section 01114 as well as the Safety and Health Plan for Building 123 Strip-Out Project, 10/97, by DWRC. However, no documentation was found supporting completion of some of the training requirements as listed in Building 123 Decommissioning Project Health and Safety Plan, RMRS, Rev. 0, June 1997. Interviews with the DWRC training coordinator showed that he, incorrectly, did not believe that the training requirements in the RMRS Health and Safety Plan superseded the others mentioned.

Post-Start Findings (must be corrected but not prior to the start of work in the field):

- General RWP:
  - The survey frequency of the RWPs was stated as "As per Rad Ops Supervision." The use of this statement should be minimized and does not meet the intent of HSP and ROI requirements.
- ALARA Review, Rev 0:
  - The ALARA Review is lacking specific information on when, where, and how glove-bags and containments will be utilized.
  - The ALARA Review is lacking specific information on when, where, and how size reduction of contaminated equipment will be performed and controlled.
- IWCP FBO410-03-2, Rev 0:
  - The IWCP is lacking specific information on when, where, and how glove-bags and containments will be utilized.
  - The IWCP is lacking specific information on when, where, and how size reduction of contaminated equipment will be performed and controlled.
  - The IWCP is lacking specific instructions on how to handle contaminated concrete slabs. Since the building provides an acceptable

containment, it may be advantageous to decontaminate these slabs during the Strip-Out Phase.

- Close-Out Radiological Survey Plan, Rev 0:
  - The Close-Out Radiological Survey Plan (CRSP) for B123 was not approved or reviewed by the K-H ERE Team. A member of the K-H ERE Team who is an SME on MARSSIM should review the CRSP for adequacy.
  - The K-H ERE Team should ensure that the Close-Out Survey is part of the stripout phase and documented as such.
  - The survey instructions under Appendix C columns "# Removable alpha/beta survey measurements" and "# Direct alpha/beta survey measurements" do not match the survey requirements in Section 4.4 Class 1, 2 and 3, Survey and Sampling Requirements. For example, Appendix C, Group 15, Survey Unit 34 instructions state "Minimum of 3/plane", however, the Section 4.4, Class 2 requirements state "one fixed alpha and beta total surface activity measurement for each one square meter (nine square feet) with a minimum of 5 per wall and/or 10 per floor." There is no discussion as to why the requirements are different than the instructions, or how and if the instructions will satisfy the requirements.

Observations (provided for information or action as Kaiser-Hill as deems appropriate):

- General RWP:
  - Since most of the RWPs have a different title but contain the same requirements, these RWPs should be combined. Due to the specific scope of work and in order to minimize worker confusion, the number of RWPs should be as limited as possible for the stripout phase, no more than two or three RWPs should be sufficient to cover all tasks.
  - The requirements for a Post-Job ALARA Review are different between HSP 6.07, Section 7.11 and REP 1002, Section 5.4. The RWP should reference REP 1002, Section 5.4. since the requirements are more encompassing. A DMR should be generated to make these procedures consistent.
  - The IWCP for the Stripout Phase (FB0410-03-2) requires radiation surveys per ROI 01.01, however, the RWPs only require contamination surveys, not radiation surveys.
  - RWPs were missing Job Supervisor employee # and signature.
  - RWPs reference AHA for additional PPE requirements. Due to this reference, the AHA would have to be available and read before each entry. In order to ensure RWP compliance the RWPs should be stand alone.
  - There is a suspension limit of 5 mrem/hr, however, radiation surveys are not required to verify the suspension limit is reached.

  - The RWPs are not clear on the Rad Ops Coverage. Note [5] is not clear when a full time RCT is required or when an On Call RCT is required.
  - Of the RWPs provided for review, there was no discussion or controls for size reduction of equipment.
- Specific RWP 97-123-0003:
  - The RWP references ALARA Review 97-123-003, however, the ALARA Review is only applicable to areas posted HCA, this RWP does not cover work in HCAs.
- Specific RWP 97-123-0007:
  - There is a suspension limit of 50 DAC, however, ARA is not listed as an allowed area for entry.
- Specific RWP 97-123-0005:
  - The RWP references ALARA Review 97-123-003, however, the ALARA Review is only applicable to areas posted HCA, this RWP does not cover work in HCAs.
  - Note [6] is a generic requirement for most work and should be incorporated in the IWCP and not on the RWP.
  - Note [7], define "contamination free" and "elevated."
  - ALARA Job Review # missing in Approval Section.
- RWP 97-123-0001, RWP 97-123-0002, RWP 97-549-6315, and RWP 97-549-6314
  - These RWPs were marked "Information Only" and "Draft," therefore, these RWPs were not reviewed.
- ALARA Review, Rev 0:
  - Heading - RWP No. missing.
  - Section I - Job description is for work in HCAs, however, RWPs for work in CAs reference this ALARA Review.
  - Section II - The words "Site Radiological Control Manual" should be added before "Table 2-2."
  - Section II - Air purifying respirators are not allowed on any of the RWPs. A note should be added that work will stop if >50 DAC and RWPs, ALARA Review, etc. will be reevaluated.
  - Section III - Per the RWRC training matrix, only 5 of 26 workers are qualified on glove bags.
  - Section III - Normally, pre-evolutionary briefings are not held before unplanned emergency conditions manifest.
  - Section IV - There is a suspension limit of 5 mrem/hr, however, radiation surveys are not required on the RWPs to verify the suspension limit is reached.
  - Section IV - The statement about full-face respiratory protection should also appear on the applicable RWP(s).
  - Section IV - The statement "Full time RCT support is required" contradicts the On-Call requirements of the RWPs.

   - Section IV – In the section titled "The use of solvents to soften the mastic," the word *minimizing* should be used instead of "preventing."
   - The ALARA Review should specify how the HCA areas will be established and controlled.
- IWCP FBO410-03-2, Rev 0:
   - As noted above, the IWCP requires radiation surveys per ROI 01.01, however, the RWPs only require contamination surveys, not radiation surveys.
   - There is no signature block for completion of the Close-Out Radiological Survey Plan.
   - The appendices were not attached to the IWCP and therefore, were not reviewed.
- Close-Out Radiological Survey Plan, Rev 0:
   - There is no discussion as to how the source storage wells, process waste sumps or potentially contaminated slabs will be handled and/or surveyed.
   - There is not adequate justification given for the survey unit classifications. Using characterization data and process history, technical justifications should be documented for each survey unit classification. A synopsis of the characterization data for each survey unit should be documented in the CRSP.
   - There is no discussion as to why building systems (e.g., fire protection, steam system, plant air, domestic water, sanitary sewer, etc.) and any other non-impacted areas, if any, are not included in the CRSP.
   - No discussion or guidance is given on how to investigate, document and resolve elevated areas, hot spots, and anomalies in the survey data.
   - There is no discussion on what statistical evaluations will be performed on the survey data or how this data will be reported.
   - Section 6.1 Step 3 - Based on a SAC-4 MDA of 18 dpm, the SAC-4 should not be used to count alpha smears since 18 dpm is 90% of the release limit of 20 dpm and does not meet the goal of using instruments which have an MDA of 50% of the release limit.
   - Section 6.1 Step 3 - The instrument (Ludlum 31) that will be used in Group 15 is not listed in the instrument table. The use of this instrument should also be included in a note on the Group 15 survey instruction form.
   - The purpose of Appendix B is not clear. The title of Appendix B is "MARSIMM Statistical Methodology," based on a review of the appendix, it does not cover what the title indicates. Why was only removable alpha and fixed beta calculated when other types of surveys will be performed, such as removable beta and fixed alpha? How do the results of these calculations effect the survey instructions? Why is the LBGR based on professional judgment when there is characterization data to support this value? What is the technical justification for the "assumed" distribution of survey results being 9 ± 3

dpm/100cm2, shouldn't this be determined from the characterization data? What does the term (0.05/0.01) mean in terms of the fixed beta result? More discussion is needed in this appendix to explain the calculations and how they relate to the CRSP. Additionally, as the title indicates, statistical methods of how the data will be handled should be discussed.

- Appendix C - The signature page should be included in the review/approval page at the front of the CRSP.
- Appendix C - The Activity Hazard Analysis should be a separate appendix since it is not radiological survey instructions as the appendix title indicates.
- Appendix C - Groups 1 and 24-28 instructions are missing Note (4).
- Appendix C - Group 15, There should be additional instruction for Group 15 to indicate how beta-gamma surveys will be performed since they are different from the normal beta only surveys. Additionally, Note 3 should have the word "gamma" added after "beta."
- Appendix C - Note (1) survey maps were not attached to the CRSP and therefore, not available for review.

- Section 6.13 Scaffolds of the Building 123 Decommissioning Health and Safety Plan states that "Fall protection shall be provided to workers during erection and dismantling activities involving 10 feet or more ..." Section 6.14 Fall Protection states that "...from a ladder where the worker's feet are more than 6 feet above the floor or ground ..." and "A full body harness is required for elevated work above 6 ft." Is fall protection required above six feet or ten feet? Do personnel wear fall arrest systems at six feet or ten feet? The discrepancy needs to be clarified.
- Section 1.5.3 Building 123 of the RFETS Emergency Plan identifies a specific population for each shift. It further identifies the most significant hazards as being hydrochloric acid, nitric acid, and hydrofluoric acid. Since the RFETS Emergency Plan governs emergency response on the site for several response organizations, the number of personnel identified who could be affected in this building by an emergency needs to be current with the actual number of personnel impacted. Emergency response units will use this figure to plan accordingly. Further, the three acids identified as significant hazards have been removed and replaced with perchloric acid crystals. Response organizations should be made aware of the change in the hazard status for the building.
- The Closure Plan for partial Closure of RCRA Unit 40 is not yet approved and requires a 45 day public comment period prior to approval. Kaiser Hill has stated they plan to proceed at risk without the approved closure plan.
- The Administrative record (AR) was adequate for the removal action under CERCLA and RFCA but the list of documents did not address public participation specifically but should if a document was publicly released for comments even though there weren't any comments received.
- If a Site Technical Administrative Record Review (STARR) meeting was held, some record of it would be a document worth considering adding to the AR.

- There is no evidence that RMRS or KH recognized that a number of procedures used in the development of the work package, and the decontamination procedure included as an appendix, for equipment removal were past their periodic review dates. Periodic reviews of procedures, such as Health and Safety Practices (HS&P), are a requirement of a Level 1 site procedure. Periodic reviews ensure the technical accuracy of the procedure and provide a method to incorporate changes in technology or procedural improvements. The condition of the periodic review of procedures has been documented in other assessments. For this reason no actions are required associated with periodic reviews for B123 stripout.
- The reliance on Statements of Work incorporated as an appendix to an IWCP work package introduces the possibility that some requirements may be missed. While the end user of the work package may be familiar with the requirements within the statement of work, in the course of performing work some of these requirements may be missed. It is not clear how changes made to an appendix, such as the statement of work, in a IWCP work package are integrated with the IWCP change requirements. It appears that changes to requirements could be made to the statement of work independently of the organizations that originally concurred to the work package.
- It appears that other organizations on site will be expected to provide services, such as draining water from systems, without their concurrence on the cover of the work package. Assuming that organizations are prepared to perform what may appear to be simple evolution's, can easily develop into delays in schedule.
- Poor coordination and communication during facility transition to a D&D facility resulted in freeze protection rounds not being performed as required during cold weather. While this may not be directly related to the KH ERE, it occurred during the KH ERE and there is no evidence that RMRS or KH was aware that this condition was allowed to occur. This issue may be related to a lack of guidance on the method for transitioning a building into a D&D status.

Recommendation: Authorize work to proceed following confirmation of prestart finding correction.

Signed:

Steve Tower (lead) ____________ Brandon Williamson ____________

Eva Jean Bryson ____________ Duane Parsons ____________

Jon Dion ____________ Bill Fitch ____________

Larry Maghrak ____________

RFFO F 220.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 11/25/97 **Time:** 1600

Assessor: Duane Parsons, AMPA,SHFAD

(Name/Organization of individual performing assessment activities)

Criteria

Site Radiological Procedures (ROI 03.01, ROI 03.02, REP-1003, REP- 1002), HSP 18.10, Site ALARA Program Plan, MARSSIM, NUREG/CR-5849

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Review of RWPs, ALARA Review, Close-out Radiological Survey Plan, Stripout IWCP, Personnel Interviews, Building Walkdown

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

RWPs, ALARA Review, Close-out Radiological Survey Plan, Stripout IWCP

Interviews Conducted: *(List Format)*

B123 Radiological Engineer (informal)
B123 Rad Ops Foreman (informal)
B123 Project Management (informal)

Activities Observed: *(List Format)*

None

Conclusions

Findings:

See attached pages.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

See attached pages.

(See Definitions)

[signature] 11/26/97

Assessor Signature **Date**

Building 123 DOE RFFO ERE Radiological Protection Observations

General Observations and Conclusions:

Based on a review of the B123 Decommissioning Equipment Stripout documentation, the K-H Environmental Readiness Evaluation (ERE) was less than adequate and the RMRS Project Team is not ready to proceed with the stripout phase. For example, the Close-Out Radiological Survey Plan for B123 was not approved or reviewed by the K-H ERE Team, nor had the Team determined whether the Close-Out Survey was a part of the stripout phase (which it should be). This problem indicates that the scope of work has not been adequately identified. Additionally, numerous technical errors exist in the RWPs, ALARA Review, Close-Out Radiological Survey Plan, and IWCP. The type of technical errors identified in the DOE RFFO review should have been self-identified by the RMRS Project Team and K-H ERE Team. Listed below are findings concerning the RWPs, ALARA Review, Close-out Radiological Survey Plan, and IWCP. This list is not all inclusive and further reviews should be performed by the K-H ERE Team and the RMRS Project Team.

Based on discussions with RMRS and DWRS Project Management, it evident that numerous, recent changes in project scope and work documents have taken place. Since many of the changes are so new, it is unlikely that the K-H ERE Team has evaluated these changes. For example, all of the asbestos work will be done by a sub-contractor using a stand-alone asbestos IWCP. However, the IWCP (FB0410-03-2, Rev 0) given to DOE RFFO for review (and presumably the IWCP given to the K-H ERE Team) contained sections for asbestos removal, in addition to all other equipment strip-out work tasks. The B123 Project Radiological Engineer was not aware that this change had taken place, nor has he reviewed the new asbestos IWCP for adequacy. Prior to the start of the B123 Strip-Out Phase the K-H ERE Team and the RMRS Project Team should go back and re-review the project scope and work documents.

General RWP - Pre-Start Findings:

1. Since most of the RWPs have a different title but contain the same requirements, these RWPs should be combined. Due to the specific scope of work and in order to minimize worker confusion, the number of RWPs should be as limited as possible for the stripout phase, no more than two or three RWPs should be sufficient to cover all tasks.
2. The survey frequency of the RWPs was stated as "As per Rad Ops Supervision." The use of this statement should be minimized and does not meet the intent of HSP and ROI requirements.
3. The requirements for a Post-Job ALARA Review are different between HSP 6.07, Section 7.11 and REP 1002, Section 5.4. The RWP should reference REP 1002, Section 5.4. since the requirements are more encompassing. A DMR should be generated to make these procedures consistent.

4. The IWCP for the Stripout Phase (FB0410-03-2) requires radiation surveys per ROI 01.01, however, the RWPs only require contamination surveys, not radiation surveys.
5. RWPs were missing Job Supervisor employee # and signature.
6. RWPs reference AHA for additional PPE requirements. Due to this reference, the AHA would have to be available and read before each entry. In order to ensure RWP compliance the RWPs should be stand alone.
7. There is a suspension limit of 5 mrem/hr, however, radiation surveys are not required to verify the suspension limit is reached.
8. The RWPs are not clear on the Rad Ops Coverage. Note [5] is not clear when a full time RCT is required or when an On Call RCT is required.
9. Of the RWPs provided for review, there was no discussion or controls for size reduction of equipment.

Specific RWP - Pre-Start Findings:

RWP 97-123-0003

1. RCAs allowed on the RWP are RMAs and CAs only, however, the suspension limits are 150,000 dpm/100cm2 beta/gamma removable and 50 DAC (150,000 dpm/100cm2 beta/gamma removable exceeds CA limits and 50 DAC would be an ARA).
2. The RWP references ALARA Review 97-123-003, however, the ALARA Review is only applicable to areas posted HCA, this RWP does not cover work in HCAs.

RWP 97-123-0007

1. RCAs allowed on the RWP are HCAs only, however, the suspension limits are 2000 dpm/100cm2 alpha and 150,000 dpm/100cm2 beta/gamma removable (2000 dpm/100cm2 alpha removable is the low end of the HCA limit, and 150,000 dpm/100cm2 beta/gamma removable is not a CA or HCA limit).
2. There is a suspension limit of 50 DAC, however, ARA is not listed as an allowed area for entry.
3. No double PPE required as per Site RCM for work in an HCA.

RWP 97-123-0005

1. RCAs allowed on the RWP are RMAs and CAs only, however, the suspension limits are 150,000 dpm/100cm2 beta/gamma removable and 50 DAC (150,000 dpm/100cm2 beta/gamma removable exceeds CA limits and 50 DAC would be an ARA).
2. The RWP references ALARA Review 97-123-003, however, the ALARA Review is only applicable to areas posted HCA, this RWP does not cover work in HCAs.
3. Note [6] is a generic requirement for most work and should be incorporated in the IWCP and not on the RWP.
4. Note [7], define "contamination free" and "elevated."
5. ALARA Job Review # missing in Approval Section.

RWP 97-123-0001, RWP 97-123-0002, RWP 97-549-6315, and RWP 97-549-6314

1. These RWPs were marked "Information Only" and "Draft," therefore, these RWPs were not reviewed.

ALARA Review, Rev 0 - Pre-Start Findings:

1. Heading - RWP No. missing.
2. Section I - Job description is for work in HCAs, however, RWPs for work in CAs reference this ALARA Review.
3. Section II - The words "Site Radiological Control Manual" should be added before "Table 2-2."
4. Section II - Air purifying respirators are not allowed on any of the RWPs. A note should be added that work will stop if >50 DAC and RWPs, ALARA Review, etc. will be reevaluated.
5. Section III - Per the RWRC training matrix, only 5 of 26 workers are qualified on glove bags.
6. Section III - Normally, pre-evolutionary briefings are not held before unplanned emergency conditions manifest.
7. Section IV - There is a suspension limit of 5 mrem/hr, however, radiation surveys are not required on the RWPs to verify the suspension limit is reached.
8. Section IV - The statement about full-face respiratory protection should also appear on the applicable RWP(s).
9. Section IV - The statement "Full time RCT support is required" contradicts the On-Call requirements of the RWPs.
10. Section IV – In the section titled "The use of solvents to soften the mastic," the word *minimizing* should be used instead of "preventing."
11. The ALARA Review is lacking specific information on when, where, and how glove-bags and containments will be utilized.
12. The ALARA Review is lacking specific information on when, where, and how size reduction of contaminated equipment will be performed and controlled.
13. The ALARA Review should specify how the HCA areas will be established and controlled.

Close-Out Radiological Survey Plan, Rev 0 - Post-Start Findings:

1. The Close-Out Radiological Survey Plan (CRSP) for B123 was not approved or reviewed by the K-H ERE Team. A member of the K-H ERE Team who is an SME on MARSSIM should review the CRSP for adequacy.
2. The K-H ERE Team should ensure that the Close-Out Survey is part of the stripout phase and documented as such.
3. There is no discussion as to how the source storage wells, process waste sumps or potentially contaminated slabs will be handled and/or surveyed.
4. There is not adequate justification given for the survey unit classifications. Using characterization data and process history, technical justifications should be documented for each survey unit classification. A synopsis of the characterization data for each survey unit should be documented in the CRSP.

5. There is no discussion as to why building systems (e.g., fire protection, steam system, plant air, domestic water, sanitary sewer, etc.) and any other non-impacted areas, if any, are not included in the CRSP.
6. No discussion or guidance is given on how to investigate, document and resolve elevated areas, hot spots, and anomalies in the survey data.
7. There is no discussion on what statistical evaluations will be performed on the survey data or how this data will be reported.
8. Section 6.1 Step 3 - Based on a SAC-4 MDA of 18 dpm, the SAC-4 should not be used to count alpha smears since 18 dpm is 90% of the release limit of 20 dpm and does not meet the goal of using instruments which have an MDA of 50% of the release limit.
9. Section 6.1 Step 3 - The instrument (Ludlum 31) that will be used in Group 15 is not listed in the instrument table. The use of this instrument should also be included in a note on the Group 15 survey instruction form.
10. The purpose of Appendix B is not clear. The title of Appendix B is "MARSIMM Statistical Methodology," based on a review of the appendix, it does not cover what the title indicates. Why was only removable alpha and fixed beta calculated when other types of surveys will be performed, such as removable beta and fixed alpha? How do the results of these calculations effect the survey instructions? Why is the LBGR based on professional judgment when there is characterization data to support this value? What is the technical justification for the "assumed" distribution of survey results being 9 $\pm$ 3 dpm/100cm2, shouldn't this be determined from the characterization data? What does the term (0.05/0.01) mean in terms of the fixed beta result? More discussion is needed in this appendix to explain the calculations and how they relate to the CRSP. Additionally, as the title indicates, statistical methods of how the data will be handled should be discussed.
11. Appendix C - The signature page should be included in the review/approval page at the front of the CRSP.
12. Appendix C - The Activity Hazard Analysis should be a separate appendix since it is not radiological survey instructions as the appendix title indicates.
13. Appendix C - Groups 1 and 24-28 instructions are missing Note (4).
14. The survey instructions under Appendix C columns "# Removable alpha/beta survey measurements" and "# Direct alpha/beta survey measurements" do not match the survey requirements in Section 4.4 Class 1,2 and 3, Survey and Sampling Requirements. For example, Appendix C, Group 15, Survey Unit 34 instructions state "Minimum of 3/plane", however, the Section 4.4, Class 2 requirements state "one fixed alpha and beta total surface activity measurement for each one square meter (nine square feet) with a minimum of 5 per wall and/or 10 per floor." There is no discussion as to why the requirements are different than the instructions, or how and if the instructions will satisfy the requirements.
15. Appendix C - Group 15, There should be additional instruction for Group 15 to indicate how beta-gamma surveys will be performed since they are different from the normal beta only surveys. Additionally, Note 3 should have the word "gamma" added after "beta."

16. Appendix C - Note (1) survey maps were not attached to the CRSP and therefore, not available for review.

IWCP FBO410-03-2, Rev 0 - Pre-Start Findings:

1. As noted above, the IWCP requires radiation surveys per ROI 01.01, however, the RWPs only require contamination surveys, not radiation surveys.
2. There is no signature block for completion of the Close-Out Radiological Survey Plan.
3. The appendices were not attached to the IWCP and therefore, were not reviewed.
4. The IWCP is lacking specific information on when, where, and how glove-bags and containments will be utilized.
5. The IWCP is lacking specific information on when, where, and how size reduction of contaminated equipment will be performed and controlled.
6. The IWCP is lacking specific instructions on how to handle contaminated concrete slabs. Since the building provides an acceptable containment, the slabs should be decontaminated or removed during the Strip-Out Phase and not during Environmental Restoration phases.

ASSESSMENT OBSERVATION

Assessment ID Number: 97-047-AI-CERCLA **Date: September 26 - November 26, 1997**

ASSESSOR: Eva Jean Bryson, Technical Assessment Division

Criteria

Decommissioning project and facility activities are focused on major planning and analysis activities for the purpose of establishing an overall safety basis. Individual project tasks are then planned, executed, and monitored. The project and facility activities include project planning, facility hazard characterization and baseline assessment, engineering analysis and technology selection, identification of applicable safety and health requirements, project hazard analysis, and establishment of project safety documentation.

Approach

In order to determine the adequacy of Building 123 Decommissioning, Decontamination, and Demolition, document and record reviews and an overall assessment of the Kaiser-Hill and its subcontractors were conducted to confirm if Kaiser-Hill and the subcontractors could successfully disposition the facility without any adverse impact to the safety envelope, the safety and health of the workers and the public, or the environment. This assessment covers Phase I Equipment Removal.

Records Reviewed:

- Closure Projects Engineering and Integration Oversight of Building 123 Equipment Stripout 97-0148-KH, dated November 18, 1997
- Proposed Action Memorandum for the Decommissioning of Building 123, Revision 4, Document Control Number RF/RMRS/97-012, dated August 21, 1997.
- Building 123 Decommissioning Project Health and Safety Plan, Document Number RF/RMRS-97-022#48, Revision 9, dated June 1997
- Safety and Health Plan for Building 123 Strip-out Project, dated October 1997 (DWRC)
- Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Document Number RF/RMRS-97-023, dated August 1997
- Reconnaissance Level Characterization Report for Building 123, Document Number RF/RMRS-97-021, dated August 1997
- Lead Characterization Report, Building 123, Revision 0, dated May 1, 1997 (SEC for RMRS)
- Waste Management Plan Building 123, Document Number RF/RMRS-97-029, dated June 1997
- Asbestos Characterization Report, Addendum to Building 123 Inspection, Revision 1, dated June 6, 1997 (SEC for RMRS)
- Construction Package Building 123 Asbestos Abatement, Revision 1, Authorization No. FB0410, dated August 26, 1997
- Safety and Health Program, Revision 0, Document Number RF/RMRS-96-0065, dated January 1997
- RFETS Emergency Plan, Revision 0, EPLAN-97, Document Number PADC-97-00336, dated February 28, 1997
- Activity Hazard Analyses Transmittal No. 97-182-DWRC, Work Order No. KH415278MC, dated November 13, 1997 (DWRC for RMRS)
- Building 123 Decommissioning Project Execution Plan, Revision 3, dated August 21, 1997
- RFETS Facility Safety Analysis Building 123 Radiological Health/Analytical Laboratories, Revision 0, dated April 1997

Interviews Conducted:

N/A

Activities Observed:

N/A

Conclusions

Finding:
Section 4.4 Hazard Analysis (AHAs/JSAs) of the Safety and Health Program identifies several specific steps to be taken when developing the hazard analysis. Section 1.1 Scope and Applicability of the Building 123 Decommissioning Health and Safety Plan states "The AHA will identify the principal steps involved and the sequence of work activities, the potential safety and health hazards associated with each step, the specific controls associated with each potential hazard, the task specific special equipment to be used in performing the activity, and monitoring requirements." Section 1.6 Health and Safety Plan Development prescribes that the AHA will include "Actual corrective measures planned to control or mitigate identified hazards." The AHAs do not meet these requirements, particularly the requirements to develop controls for the identified hazards. The concurrence of the job supervisor and the safety and health representative raises concerns regarding appropriate review. A comprehensive review of specific safety and health hazards, the analysis conducted to identify the specific hazards, and control measures to mitigate these hazards will need to be performed prior to project initiation.

Observations:
Section 3.2 Worker Health and Safety of the Proposed Action Memorandum for the Decommissioning of Building 123 states that "The project will comply with OSHA construction standards for Hazardous Waste Operations and Emergency Response, 29 CFR 1926." As was previously identified in the Decommissioning Project Execution Plan Assessment, dated May 27, 1997, the citation is wrong. The correct citation for Hazardous Waste Operations and Emergency is 29 CFR 1910.120. The Safety and Health Regulations for Construction, 29 CFR 1926, does not address Hazardous Waste Operations and Emergency Response.

Section 6.13 Scaffolds of the Building 123 Decommissioning Health and Safety Plan states that "Fall protection shall be provided to workers during erection and dismantling activities involving 10 feet or more ..." Section 6.14 Fall Protection states that "...from a ladder where the worker's feet are more than 6 feet above the floor or ground ..." and "A full body harness is required for elevated work above 6 ft." Is fall protection required above six feet or ten feet? Do personnel wear fall arrest systems at six feet or ten feet? The discrepancy needs to be clarified.

Section 1.5.3 Building 123 of the RFETS Emergency Plan identifies a specific population for each shift. It further identifies the most significant hazards as being hydrochloric acid, nitric acid, and hydrofluoric acid. Since the RFETS Emergency Plan governs emergency response on the site for several response organizations, the number of personnel identified who could be affected in this building by an emergency needs to be current with the actual number of personnel impacted. Emergency response units will use this figure to plan accordingly. Further, the three acids identified as significant hazards have been removed and replaced with perchloric acid crystals. Response organizations should be made aware of the change in the hazard status for the building.

Assessor Signature/Date Eva Jean Bryson / Nov 25, 1997

AMEC ENVIRONMENTAL READINESS EVALUATION

Assessment ID Number: 97-047-AI-CERCLA

Part A: Readiness to Proceed with Strip out of Building 123

Assessor	William Fitch	November 23, 1997
Assigned Area:	Regulatory Compliance	

CERCLA National Contingency Plan RFCA RCRA CCR

Criteria:

The 123 Decommissioning and Demolition Project addresses four buildings: 123, 123S, 113, 114. The ERE is planned to be conducted in three steps: Equipment strip out, Asbestos Removal, and Demolition.
This review is specific for the Equipment strip from Building 123. There is no equipment to strip out from the other three buildings. The criteria applicable are as follows:

RFCA/CERCLA/NCP/RCRA

RFCA ξ 70 establishes decommissioning as a non-time critical removal action performed under CERCLA.

RFCA ξ 96 establishes three forms of accelerated actions: Proposed Action Memorandum, Interim Measure/Interim Removal Action , and Rocky Flats Cleanup Agreement Standard Operating Protocol. The 123 Demolition was proposed for regulatory approval as a Proposed Action Memorandum.

RFCA Attachment 9 establishes a requirement that a Reconnaissance Level Characterization be performed and a report be provided.

RFCA ξ 283 reaffirms the maintenance of an Administrative Record to provide the information used to make decisions concerning accelerated actions.

RFCA Attachment 10 establishes a process for Interim Status RCRA/CHWA Unit Closure.

RFCA ξ118 establishes the review and approval process for Sampling and Analysis Plans created for characterizing contamination outside of or beneath buildings.

RFCA ξ 118 also establishes the review and approval process for Proposed Action Memoranda.

RFCA ξ 121 establishes the requirement that the draft Proposed Action Memorandum be subject to public comment.

RFCA ξ120 establishes the submittal of Reconnaissance Level Characterization Reports to the Lead Regulatory Agency.

Approach:

The subject documents have been obtained and reviewed to establish they are adequate and have received the required review and, where applicable, approval.

The documents are:

Proposed Action Memorandum
Draft Reconnaissance Level Characterization Report
Administrative Record
Partial Closure Plan for Building 123 Components of RCRA Unit 40
Sampling and Analysis Plan
Project Execution Plan

The Flushing of Fume Hoods was not reviewed..

Interviews Conducted:

None

Activities Observed:

None

Conclusions:

All required documents have been reviewed except for the Flushing of Fume Hoods and the Administrative Record.

Concerns:

The documents reviewed are in order.

The Closure Plan for partial Closure of RCRA Unit 40 is not yet approved and requires a 45 day public comment period prior to approval. Kaiser Hill has stated they plan to proceed at risk without the approved closure plan.

The Final Radiation Survey Plan has not been made available for review.

Flushing of Fume Hoods description has not been available for review.

Observations:

Proposed Action Memorandum

The RFCA process was followed. The draft Proposed Action Memorandum was prepared and submitted to CDPHE in late May, 1997. The draft was subject to public comment. No comments were received. CDPHE provided comments, which were incorporated. CDPHE approval of the Proposed Action Memorandum received on August 27, 1997.

Draft Reconnaissance Level Characterization Report

The RFCA process was followed. The building was characterized at the reconnaissance level. Kaiser Hill provided a Reconnaissance Level Characterization Plan which described the characterization. This was provided to RFFO and CDPHE (with a copy to EPA) after the characterization was complete. The characterization report which described the activities conducted was furnished to CDPHE with a copy to EPA.

Administrative Record

The Administrative Record was reviewed by Kaiser Hill and found to be satisfactory. A review should have occurred in May prior to submittal of the draft PAM. The Administrative Record should have been certified as complete by Kaiser Hill prior to execution of approval of the Proposed Action Memorandum by CDPHE in August 1997.

Partial Closure Plan for Building 123 Components of RCRA Unit 40

Kaiser Hill failed to use the RFCA approach available, whereby the current process waste lines in and leaving Building 123 could have been closed as part of the decommissioning; i.e., by including their closure in the Proposed Action Memorandum. In fact, the partial closure of RCRA Unit 40 was not addressed until the issue was raised in CDPHE comments on the Proposed Action Memorandum in June 1997. The draft Closure Plan has been developed in consultation with CDPHE and RFFO. On November 22, the Closure Plan was submitted for CDPHE approval.

Kaiser Hill has advised RFFO that they intend to remove the above ground portions of the piping before the Closure Plan is approved, accepting the risk of doing work without an approved Closure Plan in place. RFFO has informally discussed this approach with CDPHE and has received CDPHE assurances that this is not an unusual approach.

Sampling and Analysis Plan

The RFCA process was followed. The Old Process Waste Lines are, by definition, not part of RCRA Unit 40, having been replaced by new lines. They are part of the former Operable Unit 9, and are the subject of the Sampling and Analysis Plan. RFFO submitted the draft Sampling and Analysis Plan in September. After consultation with CDPHE, the Sampling and Analysis Plan was submitted for formal approval on November 22.

Project Execution Plan

Rocky Flats project management procedures were followed. The Project Execution Plan was approved by RFFO immediately after the approval of the Proposed Action Memorandum

William Fitch

William N. Fitch November 23, 1997

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 25 Nov 97

ASSESSOR: J. A. Dion

Criteria

Applicable or Relevant and Appropriate Requirements as required by the Comprehensive Environmental Response Compensation and Liability Act, and the Rocky Flats Cleanup Agreement, specifically:

- Colorado Air Quality Control Commission Regulation 8 Control of Hazardous Air Pollutants,
  - Part A, Subpart H: Radionuclides
  - Part A, Beryllium
  - Part B: Asbestos
  - Part C: Lead
- Colorado Air Quality Control Commission Regulation 15: Ozone Depleting Compounds
- Colorado Air Quality Control Commission Regulation 1: Smoke and Opacity
- Colorado Air Quality Control Commission Regulation 3: Air Pollutant Emission Notices
- RCRA/.TSCA Waste Identification/Characterization/Packaging/Storage/Disposal

Approach

Document reviews and personnel interviews

Records Reviewed:

Closure Projects Engineering and Integration Oversight of B123 Equipment Stripout 97-0148-KH
Proposed Action Memorandum for the Decommissioning of Building 123
Memorandum From C. A. Patnoe, K-H to D. E. Steffen, RMRS, Dated August 6, 1997
Reconnaissance Level Characterization Report, August 1997
Waste Management Plan Building 123, June 1997
Waste Management Plan Matrix, November 10, 1997

Interviews Conducted:

Carol Patnoe K-H Compliance and Performance Assessment Air Quality Management
Rob Garren, Radian Corporation
Mike Putney, Radian Corporation
Tom Kalivas, Radian Corporation
Greg Sollner, K-H Compliance and Performance Assessment

Activities Observed:

None

Summary/Conclusions:

No Findings
No Strengths

General:
All the above listed environmental regulatory requirements have been met for start-up of the Strip-Out phase. Identified weaknesses are not significant enough to delay start-up. Additional environmental requirements will have to be met during execution of the Strip-Out phase.

Subpart H Radionuclides:
The applicability of Subpart H is based on available historical data and process information provided in the Reconnaissance Level Characterization Report. The contractor and RFFO review of this Report indicate there are no radionuclide monitoring or regulatory approval requirements for the Strip-Out phase of the Building 123 decommissioning project.
Weakness: If a new source of contamination is discovered during Strip-Out, the radionuclide requirements will need to be reevaluated. There is no formal mechanism for notifying K-H/Radian of such a discovery. However, K-H/Radian is preparing a memorandum to RMRS requesting immediate notification if a new source of contamination is discovered. This is not a substitute for a formal procedural mechanism, but should increase the likelihood of notification.

Part A: Beryllium (Be)
Building 123 survey data indicate very low levels of Be contamination. At these surveyed low levels Building 123 Be air emissions are below regulatory concern.

K-H/Radian has determined from survey data that Be contamination in Building 123 is below regulatory concern for air emissions.

Part B: Asbestos:
The asbestos plan is still draft and not available for RFFO review. It will be submitted prior to any asbestos removal during the Strip-Out phase. The plan will be reviewed for adequacy by K-H/Radian prior to submittal to CDPHE. Submittal of the plan is not a requirement, only notification is a requirement. K-H/Radian will handle both notification and plan submittal. Because no asbestos removal will take place during the beginning of the Strip-Out phase, compliance with asbestos regulations is not a requirement for starting Strip-Out.

Part C: Lead:
Because of the removal methods used during the Strip-Out phase there is no potential for the lead standard to be exceeded. The source of lead is paint on walls and trim. Strip-Out does not involve the removal of walls and trim.

Regulation 15
Ozone Depleting Compounds (ODC) have been removed from the Building 123 stationary appliances and portable appliances have been removed from the Building according to verbal communication between K-H/Radian and DynCorp (DCI).
Weakness: K-H/Radian have not been provided forms indicating ODC removal. However, DCI is expected to provide these forms to K-H/Radian in early December.

Regulation 1: Smoke and Opacity
Building 123 project management has been informed that they will need to notify K-H/Radian when portable gas or diesel generators are used for the Building 123 Strip Out. Portable gas or diesel generators

Regulation 3: Air Pollutant Emission Notices (APEN)
Building 123 project management have been informed that they will need to notify K-H/Radian when portable gas or diesel generators are used for the Building 123 Strip Out. Records of fuel use will have to maintained by the operators to ensure compliance with APEN requirements. There are no start-up requirements. Compliance with this regulation is dependent upon notification and record keeping by Building 123 project management.

RCRA/.TSCA Waste Identification/Characterization/Packaging/Storage/Disposal
Building 123 project management determined that Strip-Out waste includes RCRA and TSCA identified waste. Provisions for packaging and on-Site storage are in place. Approved programs for off-Site disposal are also in place. If a waste stream not identified in the Waste Management Plan Matrix is generated then project management is required to notify K-H.

Assessor Signature

25 Nov '97
Date

RFFO F 220.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 11/26/97 **Time:**

Assessor: Steve Tower (lead assessor)

(Name/Organization of individual performing assessment activities)

Criteria RFETS 1-F78-ER-ARP.001
40 CFR 300.800
Rocky Flats Cleanup Agreement (RFCA)

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Conducted a records review and informal interview to determine the adequacy of the Administrative Record for Building 123 Demolition.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

Building 123 Administrative Records Document Summary

Interviews Conducted: *(List Format)*

An informal interview was conducted with the Administrative Record clerk in building 116.

Activities Observed: *(List Format)*

None

Conclusions
Findings:

None

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

Observation: The Administrative reocord (AR) was adequate for the removal action under CERCLA and RFCA but the list of documents did not address public participation specifically but should if a document was publicly released for comments even though there weren't any comments received.
Observation: If a Site Technical Administrative Record Review (STARR) meeting was held, some record of it would be a document worth considering adding to the AR.

(See Definitions)

Steve Tower 11/26/97

Assessor Signature **Date**

ATTACHMENT TO ASSESSMENT 97-047-AI-CERCLA (B123 ERE)

1. **Record Review:**

Kaiser Hill (KH) identified the constraint of performing primarily a document review as the means for determining Rocky Mountain Remediation Services (RMRS) readiness to proceed with equipment stripout in their correspondence to RFFO, letter 97-RF-06120 dated November 18, 1997. KH clearly stated that additional activities associated with attendance at production meetings, and pre-evolutionary briefings will be performed in the field as work begins. It is clear in discussion with KH ERE team members that a baseline level of confidence in the readiness of RMRS to begin activities was established during the KH ERE process. The documentation provided with letter 97-RF-06120 supports the KH conclusion that RMRS is ready to begin activities. It is my judgment that, for my area of responsibility, that KH has adequately determined the readiness of RMRS.

My review of the IWCP package, FB0410-03-4 ; B123 Stripout, was conducted twice. These reviews appear to have been conducted in parallel with the KH ERE. The initial review addressed procedural problems associated with IWCP work package development procedure, the referencing of procedures that are past document control periodic review requirements, the difference between requirements documented in FB0410-03-4 and additional requirements that existed in the statement of work, and little or no detail about radiological controls. A formal response was developed for my comments and while it answered most of my comments, I was prompted to perform an additional review, and deferred radiological control issues to Mr. D. Parsons. The second review of FB0410-03-4 attempted to identify requirements that existed in the statement of work that might be appropriate for inclusion into the body of the work package. The comments were discussed at a meeting with KH and RMRS personnel. A review of revision 1 to FB0410-03-4 identified that some comments were resolved by revising the work package.

My review of the B123 Stripout Plan, an appendix to FB0410-03-4, identified that this appendix addressed the perchloric flushing of hoods and duct work. The most significant comment from this review was associated with the potential emission of water from a vent duct to atmosphere from a system that was considered to be potentially radiologically contaminated. The procedure did not recognize the radiological implications should this occur. This procedure defers radiological controls to the RWP, and there was no RWP to review. As noted earlier radiological control issues were deferred to Mr. Parsons. A meeting with KH, DWRC and Resource Technology Group (RTG) was held to address my comments.

The procedure review process indicates that KH adequately reviewed the procedures to be used for B123 equipment stripout. Work package development is SATISFACTORY. Weaknesses are noted below.

Weaknesses :

- There is no evidence that RMRS or KH recognized that a number of procedures used in the development of the work package, and the decontamination procedure included as an appendix, for equipment removal were past their periodic review dates. Periodic reviews of procedures, such as Health and Safety Practices (HS&P), are a requirement of a Level 1 site procedure. Periodic reviews ensure the technical accuracy of the procedure and provide a method to incorporate changes in technology or procedural improvements. The condition of the periodic review of procedures has been documented in other assessments. For this reason no actions are required associated with periodic reviews for B123 stripout.

RFFO F 220.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 26 November 97 **Time:** 1100

Assessor: Larry Maghrak/AMPA; Facility Representative

(Name/Organization of individual performing assessment activities)

Criteria: Determine if the Kaiser Hill ERE adequately confirmed the readiness of RMRS, and their subcontractor DWRC, to perform B123 stripout phase of the D&D project. Area of evaluation will primarily focus on IWCP work package, and additional work control practices found in COOP. The fundamental aspects of radiological controls for handling and controlling potentially contaminated materials will be evaluated.

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

1. Review IWCP package, contractual Statement of Work for B123 stripout, and applicable IWCP appendices.
2. Review PAM, PEP, HASP, RWPs, and other applicable documents provided by KH.
3. Attend RMRS and DWRC meetings.
4. Interview key personnel on KH ERE team, and on RMRS project team to include DWRC supervision.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

1. IWCP work package FB0410-03-4; B123 Stripout
2. B123 Stripout plan: This is an appendix of FB0410-03-4 that addresses perchloric flushing of hoods and ducts.
3. Statement of Work from contract between RMRS and DWRC, also an appendix to FB0410-03-4.
4. KH Closure Projects Engineering and Integration Oversight of B123 Equipment Stripout 97-0148-KH.

Interviews Conducted: *(List Format)*

1. KH brief to RFFO ERE team on KH ERE findings.
2. Comment resolution meetings with KH ERE team, RMRS and DWRC.
3. Interview of DWRC supervision.

Activities Observed: *(List Format)*

1. Joint RMRS and DWRC morning meetings for planning of equipment stripout.
2. DWRC morning meeting with craft personnel.

Conclusions

Findings:

1. No pre-start or post start findings.
2. Concur that KH has correctly assessed the readiness of RMRS to perform stripout activities from a COOP and procedural perspective.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

See the attached document for discussions, strengths and weaknesses.

(See Definitions)

LLMaghrak

Assessor Signature

11/26/97

Date

- The reliance on Statements of Work incorporated as an appendix to an IWCP work package introduces the possibility that some requirements may be missed. While the end user of the work package may be familiar with the requirements within the statement of work, it has been my experience that in the course of performing work some of these requirements may be missed. It is not clear how changes made to an appendix, such as the statement of work, in a IWCP work package are integrated with the IWCP change requirements. It appears that changes to requirements could be made to the statement of work independently of the organizations that originally concurred to the work package.
- It appears that other organizations on site will be expected to provide services, such as draining water from systems, without their concurrence on the cover of the work package. Assuming that organizations are prepared to perform what may appear to be simple evolution's, can easily develop into delays in schedule.
- Poor coordination and communication during facility transition to a D&D facility resulted in freeze protection rounds not being performed as required during cold weather. While this may not be directly related to the KH ERE, it occurred during the KH ERE and there is no evidence that RMRS or KH was aware that this condition was allowed to occur. This issue may be related to a lack of guidance on the method for transitioning a building into a D&D status.

2. **Interviews Conducted:**

While attendance to the KH briefing on their ERE process and conclusions is not a formal interview process, information was exchanged verbally. During the presentation the KH ERE answered questions about the methods used in their evaluation process. The KH team also answered specific questions presented by RFFO team members. KH demonstrated an adequate level of evaluating the readiness of RMRS and DWRC.

Meetings with KH, RMRS, and DWRC to discuss comments made to FB0410-03-4 were demonstrated an interest in providing the best conditions for successful performance of B123 stripout activities. The personnel from KH, RMRS, and DWRC appeared to have considered some of my comments during earlier stages of document preparation, review and approval. For those comments that needed additional consideration KH, RMRS, and DWRC personnel appeared to understand the issues associated with the comment.

Interviews with DWRC Construction Supervisors indicated that they have a SATISAFCTORY understanding of work controls, procedural compliance, the IWCP process and LO/TO requirements. The DWRC Construction Supervisors are prepared to perform stripout activities.

The KH assessment that RMRS is ready to begin B123 stripout activities is SATISFACTORY based on interviews conducted.

3. **Activities Observed:**

My observation of the joint KH, RMRS, and DWRC morning meeting is that all organizations are cooperating to achieve the goal of B123 D&D. This meeting is formally conducted and identified priorities for RCT support, activities to be completed for that day, issues to be addressed, and some consideration of upcoming activities. If these meetings continue to be this informative, with the free exchange of information that I observed, then it is expected that B123 stripout activities will be controlled and safely performed.

ATTACHMENT TO ASSESSMENT 97-047-AI-CERCLA (B123 ERE)

My observation of the DWRC morning meeting with DWRC craft personnel is that expectations for daily activities to be accomplished are being clearly communicated. Craft personnel appear to recognize that there are work controls in place for this project, and are thinking about conditions that could impede completion of their daily activities.

At the DWRC morning meeting with craft personnel there was some evidence of a lack of communication between RMRS and DCI regarding connection of electrical power to the construction trailer. I was aware of this communication problem from attending the DCI Utilities POD meeting the day before. As the Facility Representative for site utilities I attempted to gather appropriate information from DCI and RMRS so that they could work together to get this power connection issue resolved quickly. I consider this event a good example of assuming that services can be readily and easily obtained without prior notification. This is similar to what could occur when DCI is contacted to sign the work package stating that water systems are isolated and drained.

The KH assessment that RMRS is ready to begin B123 stripout activities is SATISFACTORY based on activities observed. The joint morning meeting of organizations is considered a STRENGTH.

RFFO F 220.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 11/26/97 **Time:** 10:40 AM

Assessor: Brandon I Williamson USDOE/RFETS/AMEC/AI

(Name/Organization of individual performing assessment activities)

Criteria Criteria for this assessment were the conditions set forth in the project documentation such as the DWRC and RMRS Health and Safety Plans (rev. 0 10/97 and rev. 0 6/97 respectively), Waste Management Plan Building 123, RF/RMRS-97-029, and the Proposed Action Memorandum for the Decommisioning of Building 123, 8/21/97.

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Training records were compared with the criteria documents to determine whether the required training was completed.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

Training records were reviewed for several persons who will be working on the project. The records consisted of a matrix as to what each skill requires as well as a personal file containing each persons certificates recieved from the Training Department. Personal files were compared against the list and the list wascompared with the criteria documents.

Interviews Conducted: *(List Format)*

Ernie Bensten, RMRS Waste Management Environmental Coordinator was interviewed in T891C at 0900hrs on 11/25/97.
Ron Heitland, Project Manager was interviewed in T891C at 0930hrs on 11/25/97.
DeanLobdell, RMRS Waste Disposal 1630 hrs. on 11/25/97
Tom Bourgeois, DWRC 1020hrs. 11/26/97 Marlyce Castilleja, DWRC T130A#106 for training records1500hrs. 11/25/97

Activities Observed: *(List Format)*

N/A

Conclusions

Findings:

See attached.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

(See Definitions)

Brandon Williamson 11/26/97

Assessor Signature **Date**

Attachment

Assessment Number: 97-047-AI-CERCLA
Assessor: Brandon I Williamson USDOE/RFETS/AMEC/AI

Conclusions

Findings:

I reccomend that the following issue be addressed prior to allowing the start-up of the strip-out phase. Training records were found demonstracting completion of the required trining as outlined in both the Statement of Work section 01114 as well as the Safety and Health Plan for Building 123 Strip-Out Project, 10/97, by DWRC. However no documentation was found supporting completion of some of the training requirements as listed in Building 123 Decommisioning Project Health and Safety Plan, RMRS, Rev. 0, June 1997. Interviews with Mr Bourgeois of DWRC showed that he did not believe that the training requirements in the RMRS Health and Safety Plan superceded the others mentioned

Brandon I Williamson
11/26/97

RFFO F'220.1B
9/16/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 11/25/97 **Time:** 10:30AM

Assessor: Brandon I Williamson USDOE/RFETS/AMEC/AI

(Name/Organization of individual performing assessment activities)

Criteria Criteria for this assessment were the conditions set forth in the project documentation such as the Waste Management Plan Building 123, RF/RMRS-97-029, and the Proposed Action Memorandum for the Decommisioning of Building 123, 8/21/97. More generally, anthing that could impact the ability of the project to certify its waste for disposal was considered a criteria.

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Readiness of the Waste Management for the strip-out of Building 123 was assessed by means of interviews, document reviews and building walkthroughs. Training records were also investigated for the technicians performing the work.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

Records reviewed included: the Waste Management Plan Building 123, RF/RMRS-97-029, the Proposed Action Memorandum for the Decommisioning of Building 123, 8/21/97, D&D WSRIC books, Property Release evaluations for various non-rad waste streams, the Strip Out Package, The Lead and Asbestos Characterization reports, Environmental Checklist and a brief look at other project documents.

Interviews Conducted: *(List Format)*

Ernie Bensten, RMRS Waste Management Environmental Coordinator was interviewed in T891C at 0900hrs on 11/25/97.
Ron Heitland, Project Manager was interviewed in T891C at 0930hrs on 11/25/97.
Norm Cypher, Building 374 confirmed that it was okay to send the perchloric acis rinsate to 374, 1416hrs. 11/25/97
Tom Bourgeois, DWRC DeanLobdell, RMRS Waste Disposal 1630 hrs. on 11/25/97

Activities Observed: *(List Format)*

Building was toured on 9/30/97.

Conclusions:
~~**Findings:**~~

Based on document reviews, interviews and building walkthroughs, I conclude that the contractors are prepared to manage the anticipated wastes resulting from the strip-out of Building 123. This assessment showed that the characterization of the waste stream they expect to encounter are ready in the form of WSRIC books and Rad Engineering approved Property Release Evaluations. Disposal sites are clearly identified for all waste types anticipated. The training of the waste generators was verified and arrangements for waste inspectors were made.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

(See Definitions)

Brandon I Williamson 11/26/97

Assessor Signature *Date*

AMEC ENVIRONMENTAL READINESS EVALUATION PLAN

Assessment ID Number: 97-047-AI-CERCLA **Date:** 9/26/97

Assessment Driver: ICAP

Assessment Scope:
This assessment will determine if Kaiser-Hill (KH), the Integrating and Management Contractor (IMC), and Rocky Mountain Remedial Services (RMRS) have the program and procedures in place to adequately and safely D&D Building 123. The Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) have approved the actions to be taken to D&D B123. This work will be performed in 3 phases; 1)Equipment removal, 2)asbestos removal, and 3)building demolition. This assessment will determine if the contractors will meet the requirements of the documents that describe the actions for equipment removal and asbestos removal.

Assessment Type: Environmental Readiness Evaluation, Environmental Readiness Review

Frequency: Once

Included in FY97 AMEC Assessment Schedule: Yes

Assessment Techniques: Team

Performance Objectives and Criteria:
The criteria that the contractor will be evaluated against is the Proposed Action Memorandum (PAM) for the Decommissioning of Building 123. The Field Implementation Plan (FIP) further defines the actions described in the PAM. The Health And Safety Procedure (HASP) will be used as the criteria for worker, public and environmental health and safety. The Sampling and Analysis Plan (SAP) defines the criteria for sampling and analysis of material. The following criteria will be used in conjunction with the contractors documents to determine if the decommissioning of B123 would be safely and adequately accomplished if the requirements of these documents and procedures are met.

Core Elements: Each of the core elements listed below shall be addressed.

- Safety documentation is in place that describes the hazards/risks associated with the facility and should identify mitigative measures that protect workers and the public from those hazards/risks.
- There are adequate and correct procedures and safety limits for operating the utility systems.
- A program is established to promote a site-wide culture in which personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and through their actions, demonstrate a high-priority commitment to comply with these requirements.
- Environmental Compliance requirements are properly identified, approved, and met.
- Lessons learned from previous similar projects have been incorporated into the project plan and documentation.
- Training and qualification programs for decontamination and decommissioning personnel have been established, documented, and implemented. (The training and qualification program encompasses the range of duties and activities required to be performed.)

- Level of knowledge of decontamination and decommissioning personnel is adequate based on reviews of examinations and examination results and selected interviews of operating and operations support personnel.
- A process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations, and the operating contractor.
- Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented with line management responsibility for control of safety.
- A systematic review of the facility's conformance to applicable DOE Orders has been performed, any nonconformances have been identified, and schedules for gaining compliance have been justified in writing and formally approved.
- The technical and managerial qualifications of those DOE personnel who have been assigned responsibilities for providing direction and guidance to the contractor are adequate.
- The breadth, depth, and results of the responsible contractor review are adequate to verify the readiness of the facility for the decommissioning project.
- The technical and management qualifications of contractor personnel responsible for facility operations are adequate..

Deliverables:
Draft Report - 10/14/97
Final Report - 10/15/97

Logistics Preparation:
- Clearance Requirements - None
- Radiological Protection Requirements - As required by RWP
- Worker Safety Requirements - Per OSHA
- Transportation Requirements - None
- Training Requirements - None
- Assessment Schedule - Start ?, Final Report ?
- Contractor Interface - In brief will be scheduled, out brief will be scheduled.
- Other

Scope of Work:
- Review HASP, ensure required protective equipment, pause/hold/stop points, response requirements for unplanned events, and other measures taken for the protection of workers, the public, and the environment are adequate, well defined and can be implemented, including review of Activity Hazard Analysis (AHA) - *Parsons, Bryson, Maghrak*
- All regulatory compliance requirements are met. Specifically, Comprehensive Environmental Response Compensation and Liability Act (CERCLA), National Contingency Plan (NCP), Rocky Flats Cleanup Agreement (RFCA), Resource Conservation and Recovery Act (RCRA), and the Colorado Code of Regulations (CCR). - *Dion, Fitch, Grillon*
- Walkdown the whole work area to ensure that necessary protective and emergency equipment is available - *Parsons, Maghrak*
- Ensure that adequate emergency preparedness is in place for radiological, industrial, and environmental accidents - *Parsons, Bryson*
- Ensure contingency plans are in place if higher than expected levels of radiological contamination, or any other unexpected contaminations are found - *Parsons*

- Form team, set up meetings, contractor briefs - *Erickson*
- Review management and chain of command structure for adequacy so that problems are promptly raised to the proper level and appropriately dispositioned. Management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure support services are adequate for safe operations. - *Erickson*
- Permit waivers for Temporary Units (TU) are planned for and available if needed - *Erickson*
- Sufficient resources are available to complete the project. - *All*
- Review the draft contract for the asbestos removal. This contract needs to clearly show how the sub-contractor will meet and comply with the Rocky Flats requirements - *Bryson*
- Ensure that any lead abatement is performed in accordance with applicable regulations. - *Bryson*
- Walkdown the whole work area to ensure that the necessary monitoring equipment is available - *Fitch, Maghrak, Bryson*
- Review SAP, ensure that the implementation of this plan for adequacy to protect the workers, public, and the environment, and can and will be adequately carried out - *Dion*
- Review clean-up and close out activity plans for adequacy - *Dion*
- Evaluate proper disposition of wastes generated during the decontamination and decommissioning - *Williamson*
- Review FIP, ensure that the FIP meets all the requirements of the PAM and properly refers to the HASP & SAP when needed - *Maghrak*
- Handling, transportation and transfer of radiologically contaminated material - *Parsons*
- Handling, transportation and transfer of asbestos - *Bryson*
- There are adequate and correct procedures and safety limits for operating the utility systems. - *Maghrak*
- Level of knowledge of decontamination and decommissioning personnel is adequate based on selected interviews of decontamination and decommissioning personnel. - *Maghrak, All*
- Review operator and management training for the remediation including the sub-contractor for the treatment (OSHA, RCRA, Rad. worker, and project specific training). Training and qualification programs for decontamination and decommissioning personnel have been established, documented, and implemented. - *Grillon*

Assessment Team:

Name	Assessor Qualification	Technical Competency
Mike Erickson	Lead Assessor	Operations, Environmental
Bill Fitch	none	D&D, Environmental
Jon Dion	Lead Assessor	CERCLA
Duane Parsons	Assessor	Health & Safety
Larry Maghrak	Assessor	H&S, Operations, Environmental
Brandon Williamson	Lead Assessor	Operations, Environmental
Eva Jean Bryson	Assessor	H&S
Joy Grillon	none	RCRA

Prepared by: Mike Erickson, Mike Erickson 9/26/97

Approved by: Steve Tower, [signature] 9/26/97

P-1325.01(REV.9/97)
:viously RF-46522

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NSUSSEN, S.J.		
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AILSFORD, M.D		
YNER, C.J.		
OGE, L.		
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POVE, M.M.		
TER, W.L.		
FORD, A.C.		
ERA, D.W.		
ERA, K.P.		
DING, W.A.		
RING, C.L.		
L, J.A.		
RTINEZ, L.A.		
RKER, A.	X	X
LER, R.E.		
ORHEIS, G.M.		
SRR, K	X	X
SDAHL, T	X	X
ZUSE, J	X	X
OR CONTROL	X	X
DMN RECORD	X	X
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January 21, 1998
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REPLY TO RFP CC
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TR APPROVALS:

RIG & TYPIST INITIALS

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COMPANY

January 27, 1998

98-RF-00371

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

BUILDING 123 STRIP-OUT ENVIRONMENTAL READINESS EVALUATION (ERE) POST-START FINDINGS, ASSESSMENT ID NUMBER 97-047-AI-CERCLA - AMP-007-98

PURPOSE

The purpose of this letter is to provide closure to the DOE Audit and their Post Start Findings on the Building 123 Strip-Out Phase ERE Assessment.

DISCUSSION

This letter addresses DOE's Post-Start Findings in the same order as listed in the Assessment Report dated December 1, 1997.

Finding: General Radiation Work Permit (RWP) - The survey frequency of the RWPs was stated as "As per Rad Ops Supervision". Use of this statement should be minimized and does not meet the intent of the Health And Safety Plan (HSP) and the Radiological Operating Instructions (ROI) requirements.

Response: The phrase "As Per Rad Ops Supervision" has been removed and more definitive directions on survey frequencies have been added to the RWPs. The modifications were reviewed with Radiation Engineering and DOE prior to being issued. A copy of RWP number 98-123-003 is attached which contains the new instructions.

Finding: As Low As Reasonably Achievable (ALARA) Review, Rev. 0 - The ALARA Review is lacking specific information on when, where, and how glove-bags and containments will be utilized.

Response: Based upon the review of this finding with DOE, this section was expanded to include other areas which will require the use of containments. A copy of the ALARA Job Review, Revision 2 has been attached for information.

Kaiser-Hill Company, L.L.C.
Courier Address: Rocky Flats Environmental Technology Site, State Hwy. 93 and Cactus, Rocky Flats, CO 80007 • 303.966.7000
Mailing Address: P.O. Box 464, Golden, Colorado 80402-0464

Comment: ALARA Review, Rev. 0 - The ALARA Review is lacking specific information on when, where, and how the size reduction of contaminated equipment will be performed and controlled.

Response: The ALARA Review does not address size reduction of contaminated equipment because equipment known to be contaminated will not be size reduced (mechanically compacted). Equipment which is to be compacted is being verified to be free of removable contamination and measurable fixed contamination (direct survey method). The compacted equipment will either be free released for disposal or disposed of as low level waste in cases where it is painted or cannot be free released.

Comment: Integrated Work Control Program (IWCP) FB0410-03-2, Rev. 0 - The IWCP is lacking specific information on when, where, and how glove-bags and containments will be utilized.

Response: The use of glove-bags and containments for breach of the process waste system is called out in the ALARA Job Review. The field work is controlled through the RWP and the ALARA Job Review. Both of these documents are included and controlled as part of the IWCP. No change is recommended to the IWCP to avoid listing requirements in more than one section of the document.

Comment: IWCP FB0410-03-2, Rev. 0 - The IWCP is lacking specific information on when, where, and how size reduction of contaminated equipment will be performed and controlled.

Response: Equipment which is to be compacted is being surveyed and verified to be free of removable contamination and measurable fixed contamination (direct survey method). Specific requirements for size reduction of non-contaminated equipment are contained in Attachment 9.10 of the IWCP and the associated RWP. The IWCP copy reviewed by the ERE Team did not contain the Attachments. The complete IWCP can be reviewed in the field or a current copy can be provided if requested.

Comment: IWCP FB0410-03-2, Rev. 0 - The IWCP is lacking specific information on how to handle contaminated concrete slabs. Since the building provides an acceptable containment, it may be advantageous to decontaminate these slabs during the Strip-Out Phase.

Response: The Demolition Phase IWCP contains a prerequisite hold point for the completion of the Close-Out Final Survey Plan (CRSP). The CRSP has been modified to include the requirement to decontaminate and/or immobilize the contamination found on the slab. This will ensure the slabs are properly decontaminated and/or sealed before the building is removed. A copy of the CRSP is attached for information. The project is preparing a work plan to address any decontamination and/or immobilization efforts. The work plan will be issued after completion of the asbestos floor tile removal and the associated radiation surveys.

Comment: CRSP, Rev. 0 - The CRSP for Building 123 was not approved or reviewed by the Kaiser-Hill ERE Team. A member of the Kaiser-Hill ERE Team who is an Subject Matter Expert on Multi-Agency Radiation Survey and Site Investigation Manual should review the CRSP for adequacy.

Response: The CRSP was not reviewed as part of the Strip-Out ERE by the Kaiser-Hill ERE Team. The CRSP was previously determined to be a prerequisite to the initiation of work on the Asbestos Abatement and Demolition phases. Subsequent to the Strip-Out ERE, a copy of the CRSP has been received by the K-H ERE Team and has been reviewed.

Comment: CRSP, Rev. 0 -The K-H ERE Team should ensure that the Close-Out Survey is part of the Strip-Out phase and documented as such.

Response: As discussed above, the Close-Out Survey is a prerequisite for work on the general Asbestos Abatement and the Demolition phases of work. Areas where Abatement activities need to occur prior to completion of the Close-Out Survey (remove carpet, tile, etc.) are the exception to this statement. A prerequisite is included in those IWCPs for the documentation of the Close-Out Survey. It is not necessary to include the Close-Out Survey as part of the Strip-Out phase.

Comment: CRSP, Rev. 0 - The survey instructions under Appendix C columns "# Removable alpha/beta ... with a minimum of 5 per wall and/or 10 per floor." There is no discussion as to why the requirements are different than the instructions, or how and if the instructions will satisfy the requirements.

Response: The CRSP has been separately reviewed with DOE and is being revised to close the findings and observations from the ERE Assessment Report. A copy has been attached for your information.

Building 123 Strip-Out ERE Observations will be addressed in a separate letter.

RESPONSE REQUIREMENTS
Please forward this information to the DOE Assessment Team. Contact my office at extension 4163, if there are any additional comments or concerns regarding the Building123 Strip-Out ERE Assessment Findings.

Tim G. Hedahl for
Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

KLK:alw

cc:

Reginald Tyler	DOE, RFFO
Bill Fitch	DOE, RFFO
Duane Parsons	DOE, RFFO
Larry Maghrak	DOE, RFFO

CORRES. CONTROL
OUTGOING LTR. NO.
DOE ORDER #.

97-RF 06522

DIST.	LTR	ENC
ANSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BUHL, TONY		
BURDGE, LARRY		
HARDING, WYNN		
CARD, BOB		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TILLER, ROBERT		
TUOR, NANCY		
VOORHEIS, GARY		
Crowe, Steve	X	X
Bruse, Jill	X	X
Buhl, Tony		
Daniels, Kevin	X	X
Davis, Bob		
Gillen, Bill		
Leonard, Eric	X	X
Miles, Paul		
Miller, John	X	X
Schmalz, Greg	X	X
Steelman, Mark		
Walker-Lembke, S.		
Hedahl, Tim		
Evans, Ben	X	
Rodgers, Alan		
Dorr	X	X
A. Barbere	X	X
S. Bradfield	X	X
D. Boley	X	X
M. Putney	X	X
G. Sollner	X	X
CORRES.CONTROL	X	X
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:

UCNI		
UNCLASSIFIED	X	X
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:
Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
SJB :rwa

RF-46469 (Rev. 3/97)

KAISER•HILL
COMPANY

December 16, 1997

97-RF-06522

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

AUTHORIZATION TO PROCEED WITH BUILDING 123 ASBESTOS ABATEMENT - AMP-197-97

Refs: (a) K. A. Klein ltr, 05078, to A. M. Parker, Environmental Readiness Evaluation, June 30, 1997
(b) A. M. Parker ltr, AMP-122-97, to K. A. Klein, Building 123 Cluster Phased Environmental Readiness Evaluation Approach, August 28, 1997

In accordance with reference (a), Kaiser-Hill (K-H) is submitting written notification to the Office of the Assistant Manager for Environmental Compliance informing them that Rocky Mountain Remediation Services (RMRS) is ready to proceed with the asbestos abatement phase of the Building 123 Decommissioning Project. As discussed in reference (b), Building 123 Cluster Phased Environmental Readiness Evaluation Approach, efforts for the Building 123 Decommissioning Project will be conducted in three phases: (1) equipment stripout, (2) asbestos abatement, and (3) demolition. Oversight of the equipment stripout phase has been completed and oversight of the remaining phase, demolition, will be conducted at a later date. DOE will be notified as appropriate when oversight of the demolition phase is to begin.

Attached are the results of the K-H oversight of the Building 123 asbestos abatement phase of the project. The graded approach was applied for the asbestos abatement phase of the project and credit was taken for documents reviewed and interviews conducted in the equipment stripout phase. The overall conclusion of the review team was that the proper controls are in place to safely perform the activities. Field oversight of project control implementation will be conducted in a joint effort with the DOE ERE team just prior to the beginning of field work and oversight of the work performance will continue as the work progresses.

Also in accordance with reference (a), K-H is requesting written notification that the Building 123 project is authorized to commence equipment stripout.

Kaiser-Hill Company, L.L.C.
Courier Address: Rocky Flats Environmental Technology Site, State Hwy. 93 and Cactus, Rocky Flats, CO 80007 • 303.966.7000
Mailing Address: P.O. Box 464, Golden, Colorado 80402-0464

If you have any questions on this matter, please contact Jill Bruse at Extension 4807 or pager 212-3377.

Alan M. Parker

Alan M. Parker
Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

SJB:rwa

Attachment:
As Stated

cc:
Orig. and 1 cc - K. A. Klein

CLOSURE PROJECTS

ENGINEERING AND INTEGRATION

OVERSIGHT OF

B123
ASBESTOS ABATEMENT
97-0148-KH

December 16, 1997

Jill Bruse

S. J. Bruse, Assessment Lead

Closure Project's Oversight of B123 Asbestos Abatement Phase

1.0 Summary

Kaiser-Hill's oversight of the Rocky Mountain Remediation Services (RMRS) Building 123 (B123) asbestos abatement phase of the B123 decommissioning project was performed in December of 1997. The decommissioning of B123 will be conducted in three phases, as follows:

- Equipment stripout,
- Asbestos abatement, and
- Demolition

The oversight summarized here focused on the second phase, asbestos abatement. Oversight of the equipment stripout phase has been completed. The third phase will be overseen separately, and will require separate authorization to proceed. The review team evaluated RMRS and subcontractor documentation prepared that defines and controls the work required, the training of on-site individuals responsible for the removal activities, and the overall readiness of RMRS and their subcontractors to perform the asbestos abatement activities. The graded approach was applied to the oversight of the asbestos abatement phase of the project and credit was taken for documents reviewed and interviews conducted in the previous phase, equipment stripout.

It is determined that the proper controls are in place and the B123 asbestos abatement phase of the project is ready to proceed. Activities will commence when work authorization notification is received from DOE.

Oversight of B123 project control implementation will be conducted in the field for asbestos abatement requirements and will be conducted in concert with DOE.

2.0 Introduction

K-H oversight consisted of an evaluation of the documentation prepared to define and control the project, the training of on-site individuals responsible for the removal activities, and the overall readiness to perform the activities. A review team was assembled to perform the evaluation. The team was comprised of the following personnel:

Jill Bruse	Closure Projects Engineering and Integration
Dick Boley	Asbestos Abatement
Shawn Bradfield	Health & Safety

Kevin Daniels	Radiological
Eric Leonard	Decontamination & Demolition
Mike Putney	Air Quality
Greg Sollner	Environmental Compliance/Waste

3.0 Review Method

The evaluation generally followed the guidance contained in DOE letter, Keith Klein to Alan Parker, AI:JG:05078, dated June 30, 1997, *Environmental Readiness Evaluation.* A checklist was used to ensure that appropriate areas were evaluated. The completed checklist used for the oversight efforts is contained as Attachment 2.

The evaluation included a review of the documentation prepared to support the project activities, interviews with project personnel and a review of on-site training plans and records. The two major areas, (1) Project documentation review; and (2) Training and personnel readiness, are discussed below.

3.1 Project Documentation Review

The documentation reviewed addressed the activities and hazards expected to be encountered. Issues regarding documentation identified during the course of the assessment were corrected. Major documentation reviewed included but was not limited to:

- Health and Safety Plans
- Waste Management Plan
- Master Activity List Approval
- Asbestos Characterization Report
- Preliminary Hazard analysis
- Integrated Work Control Package
- Subcontractor submittals
- Asbestos Abatement Plan
- Radiation work permit
- Activity Hazard Analysis

3.2 Training and Personnel Readiness

Asbestos Free Insulation Contracting, Inc. (AFIC) group training records for the employees utilized in the asbestos abatement of B123 will be verified prior to the start of work in the field. Rosters for required orientation, pre-evolutionary briefings, weekly safety meetings, and tool-box safety meetings will also be reviewed. Delaying the briefing and corresponding review is preferred since the briefings will not be occurring until just prior to the start of the field work and personnel are not currently on site.

B123 ASBESTOS ABATEMENT CHECKLIST

PAGE 1
12/16/97

Attachment 2

AMP-197-97

Item	Checklist	Supporting Evidence	Results
	CORE REQUIREMENTS		
1	Verify there are adequate and correct safety procedures to conduct asbestos abatement.	• RMRS Site Health and Safety Plan • Building 123 Asbestos(HASP) • Preliminary Hazard Analysis *Verification requirement*: Review AHA as produced.	***Asbestos Abatement:*** *Field oversight required— The procedures needed to safely perform this project are included in the Site Health and Safety Plan (HSP) or the Building 123 Asbestos (HASP). The Preliminary Hazard Analysis (PHA) has been written for the project and is included in the HASP. Per contract specifications the project AHA's have not been developed at this time. The AHA will be submitted and reviewed (for the appropriate level of detail) and approval prior to task implementation.*
2	Verify work control documentation assures compliance with environmental regulatory requirements/regulations and regulator approved project documents.	• *Proposed Action Memorandum (PAM)* • *Statement of Work for Asbestos Abatement* • *Project Execution Plan (PEP)* • *Asbestos Abatement Plan* • *Administrative Record*	***Asbestos Abatement:*** ***Environmental regulatory requirements have been met through approved project documents.*** *CDPH&E requires that the asbestos abatement plan be submitted to CDPH&E one week prior to implementation for review. Kent Dorr, K-H, has maintained communications with CDPHE and they are aware of the project status.* • *The Asbestos Abatement Plan has been submitted to CDPHE.* • *K-H reviewed the Administrative Record and it is satisfactory.*
3	Verify that <u>any required</u> Colorado Air Quality Control Commission Regulation No. 3 APEN (inventory reporting) documents have been submitted to the CDPHE, Air Pollution Control Division. (Note: If pollutant specific inventory thresholds are not tripped, APENs are not required.)	• *C&PA-AQM letter No. CAP-101-97 addressing technical assessment of planned activities for strip-out asbestos abatement and demolition of B123.*	***Asbestos Abatement:*** *Satisfactory—Review of the information in technical assessment indicates that emission levels of non-radionuclide air pollutants do not exceed Air Pollutant Emission Notice (APEN) reporting thresholds and radionuclides do not exceed monitoring or approval thresholds.*
4	Verify that the RFCA/CERCLA decision documents for decommissioning Building 123 include the assessment of asbestos air pollutant emissions. Verify that the required RFCA decision documents include adequate information concerning potential air pollutant emissions and their impacts on public health and the environment for the regulators and the public to make informed decisions during the public comment process.	• *PAM* • *C&PA/AQM technical assessment letter/CAP-101-97* • *Interviews with personnel*	***Asbestos Abatement:*** *Satisfactory—The PAM information indicates that potential air emissions of asbestos have been evaluated. Asbestos is identified as specific Applicable or Relevant Appropriate Requirements (ARARs) under the CAA for asbestos removal operations.*
5	Verify that asbestos related ARARS have been identified and project control documents provide for their implementation.	• *PAM* • *SOW for the asbestos removal phase* • *Waste Management Plan* • *Bldg reconnaissance characterization plan*	***Asbestos Abatement:*** *Satisfactory—Asbestos requirements are identified as ARARs for the project. Implementation is spelled out in specific asbestos removal documents.*

B123 ASBESTOS ABATEMENT CHECKLIST

Item	Checklist	Supporting Evidence	Results
6	Verify that there is a contingency plan to address un-anticipated hazards that could generate air pollutant emissions and have an adverse impact on public health and the environment. Verify that Air Quality Management (AQM) has been appropriately included in the identified contingency plan	• *PAM* • *Health and Safety Plan* • *Project Execution Plan (Rev 4)*	*Asbestos Abatement: Marginal*—***The contingency plan to address unanticipated hazards are included in various documents.*** *Compliance and Performance Assurance (C&PA) Air Quality Management* ***must*** *be notified if an unanticipated finding or event occurs that adversely alters the original CAA assessment for this project.*
7	Verify that the mitigation of fugitive dust emissions generated from demolition operations is addressed in a control plan specific for Building 123.	• *Not applicable to this phase of the project*	*Asbestos Abatement: Not applicable to this phase of the project.*
8	Verify that asbestos abatement activities are appropriately documented and meet the regulatory requirements of CAQCC Regulation No. 8 notification, permit, and training requirements.	• *CDPHE Asbestos Abatement Plan* • *Asbestos Abatement Notification to State* • *Asbestos Abatement Permit*	*Asbestos Abatement: Satisfactory*—***The asbestos abatement plan has been submitted to the CDPHE. The asbestos abatement plan appropriately documents asbestos abatement activities and meets requirements.***
9	Verify that the use of any fossil fuel-fired combustion equipment (i.e. generators) for alternate power support meets any applicable inventory reporting and permitting requirements of CAQCC Regulation No. 3, and opacity requirements of CAQCC Regulation No. 1	• *Interview with B123 RMRS Project Manager.*	*Asbestos Abatement: Satisfactory—Diesel or gasoline fined engine use will be tracked. Project management will coordinate with AQM/Radian staff to ensure operations of units are compliant with CAQCC Reg No. 1 and 3 requirements.*

B123 ASBESTOS ABATEMENT CHECKLIST

PAGE 3
12/16/97

Item	Checklist	Supporting Evidence	Results
12	Verify that asbestos waste streams which will be generated during asbestos abatement phase have been accurately identified. Verify that identified waste streams will be characterized, packaged and dispositioned to K-H list approved off-Site disposal facilities.	• *B123 Reconnaissance Level Characterization Report.* • *B123 Asbestos Characterization Report.* • *Waste Generator Instructions for B123 Asbestos Abatement.* • *Waste Stream and Residue Identification and Characterization (WSRIC). Decontamination and Decommissioning Building Book* • *B123 SOW and IWCP for Asbestos Abatement, including Specifications 02082 and 01610, Asbestos Removal Requirements and Material Handling and Waste Disposal.* • *List of disposal facilities.* • *Subcontractor documents.* • *PAM*	***Asbestos Abatement:** Satisfactory—**Work control documents** have been developed which assure characterization in accordance with WSRIC and packaging and handling per approved Site procedures. Additionally, Waste Generator Instructions have been completed and approved for each of the asbestos waste streams. These instructions detail the characterization basis, package type and quantity, labeling instructions, liner requirements, packaging and storage requirements.* *Waste streams expected to be generated as part of the asbestos phase and corresponding management facilities are identified on waste management matrix table. **NOTE: The table must be updated for any new waste generated. Waste generated can only be managed at K-H approved facilities. K-H must be notified of any new waste streams generated.*** *All facilities identified for the disposal of asbestos wastes from the D&D of Building 123 are KH approved facilities. However, Rad contaminated asbestos wastes designated for shipment to Nevada Test Site are not approved in so far as NTS does not yet have CERCLA approval status. The process for NTS receiving said approval may take some time, however, the very minimal volume estimates for rad contaminated asbestos waste should not preempt the commencement of Asbestos Abatement in Building 123. Resolution of this issue is ongoing at this time. Rad contaminated asbestos waste volume projected for this project is low and can be stored on site until resolution of this issue.*
13	Verify that modifications and additions to the Building 123 decision document (PAM) have been reviewed for adverse impacts to air quality.	• *No modifications to the PAM have been submitted as of 11/10/97.* • *Interview with Ted Hopkins.*	***Asbestos Abatement:** Satisfactory—No modifications to the PAM after 11/10/97 have been submitted.*

Best Available Copy

B123 ASBESTOS ABATEMENT CHECKLIST

PAGE 4
12/16/97

Item	Checklist	Supporting Evidence	Results
14	Verify that the emergency response actions are communicated to the employees.	• *Specification 01700 Project orientation*	***Asbestos Abatement:*** ***Field oversight required****—Verification will be conducted in the field at pre-evolutionary briefing.*
15	Verify that the NEPA checklist has been completed.	*NEPA checklist*	***Asbestos Abatement:*** *Satisfactory—Documentation submitted to K-H prior to project commencement was adequate information to review the project with respect to strip-out, asbestos, and demolition phases.*
16	Verify training and qualification programs for asbestos abatement and asbestos abatement support personnel have been established and documented.	• *Specification 02082* • *Colorado reg 8* • *SOW* • ***Training matrix***	***Asbestos Abatement:*** *Field oversight required—* • ***Training requirements are identified in the 123 training matrix, and in the 02080 asbestos specification.*** • ***Qualification requirements for subcontractor supervisory positions*** *such as project supervisor and health and safety professionals and other "competent persons" are established are established in the Statement of Work (SOW), Specification 01700 under General Subcontractor Supervisors, General Subcontractor Safety and Health Professionals, and Appendix 3, Supervisor/Designated Safety and Health Requirements.* • ***Training and qualification verification will be conducted in the field.***
17	Verify the level of knowledge of asbestos abatement and asbestos abatement support personnel is adequate based on interviews of personnel.	• *Interviews of personnel will be conducted in the field.*	***Asbestos Abatement:*** *Field oversight required—Interviews will be conducted in the field.*
18	Verify safety documentation is in place that describes the "safety envelope" of the project. The safety documentation should characterize the hazards/risks associated with the project and should identify mitigative measures that protect workers and the public from those hazards/risks. Safety system and system essential to worker and public safety are defined and a system to maintain control over the project.	• *Preliminary Hazard Analysis (PHA)* • *Work Control Package* • *DRS-077-97 dated 8/19/97* • *RMRS HASP RF/RMRS-97-022#48, Rev. 0 6/97*	***Asbestos Abatement:*** *Satisfactory—DRS-077-97 was a complete replacement for the previous hazard classification documentation. This second document was generated to address the concern raised regarding project controls credited in DRS-058. This Auditable Safety Analysis (ASA) also considered current versions of project documents and status. The project has been re-classified as Radiological. This is considered appropriate given the nature of the work. The controls credited to maintain the project hazard classification are expected to be adequate when implemented.*
19	Verify a process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations, and the operating contractor.	• *Comment resolution sheets* • *Status meetings*	***Asbestos Abatement:*** *Satisfactory—* • *Resolution of deficiencies are conducted through the formal design package review described in the Conduct of Engineering manual (COEM).* • *The project conducts weekly status meetings and project walkdowns.*

B123 ASBESTOS ABATEMENT CHECKLIST

Item	Checklist	Supporting Evidence	Results
20	Verify management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure operational support services are adequate for safe operations.	• *IWCP for abatement activities* • *Asbestos abatement subcontractor submittals*	***Asbestos Abatement:** Satisfactory—**Management programs are established, sufficient numbers of personnel are proposed. AFIC is to provide equipment for operations.***
21	Verify that functions, assignment, responsibilities, and reporting relationships are clearly defined and effectively implemented with line management responsibility of control of safety.	• *Asbestos abatement HASP* • *PEP*	***Asbestos Abatement:** Satisfactory—The site-specific HASP identifies functional roles and reporting responsibilities. The Project Execution Plan clearly identifies the reporting relationships within a section identified as "Key Projects Personnel Matrix", Table 7-1. This section specifically address the Health and Safety Officers responsibilities.*
22	Verify a program is established to promote a site-wide culture in which personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and through their actions, demonstrate a high-priority commitment to comply with these requirements.	• *RMRS Health and Safety Program (RF/RMRS-96-0065)*	***Asbestos Abatement:** Satisfactory—* • *RMRS's H&S Program (RF/RMRS-96-0065) describes a robust set of actions designed to promote a culture which places a high priority on awareness of safety and environmental protection.* • *RMRS is also actively engaged in the voluntary protection program (VPP).*
23	Lessons learned form previous similar projects are adequately addressed.	• *Lessons learned are reviewed by RMRS weekly at staff and project meetings.* • *Health and Safety utilized lessons learned in the development of documents.*	***Asbestos Abatement:** Field oversight required—Sharing Lessons Learned verification will be conducted in the field.*
	OPTIONAL		
24	Verify that a systematic review of the facility's conformance to applicable DOE Orders has been performed, any nonconformance have been identified, and schedules for gaining compliance have been justified in writing and formally approved, or waivers granted.	• *Environmental Readiness Checklist*	***Asbestos Abatement:** Satisfactory—An environmental readiness checklist has recently been completed which lists plans and procedural requirements specified in the DOE orders. Examples requirement include: Project plans (DOE Order 4700.1) Characterization Plans (DOE Order5820.2A) Health and Safety Plans (29 CFR 1910.120).*
25	Verify a routing and emergency contingency plan, has been established and implemented.	• *The site wide RFETS emergency operations plan is in effect for the entire site.*	***Asbestos Abatement:** Field oversight required—Verification that emergency procedures are reviewed will be conducted in the field.*
26	Verify the technical and management qualifications of subcontractor personnel responsible for conduct of asbestos abatement operations are adequate.	• *Qualifications/Supervision and Safety and Health professional* • *State licensing documentation*	***Asbestos Abatement:** Satisfactory—Qualifications and training of subcontractor technical and management personnel are adequate.*

B123 ASBESTOS ABATEMENT CHECKLIST

PAGE 6
12/16/97

Attachment 2

AMP-197-97

Item	Checklist	Supporting Evidence	Results
27	Verify a program is in place to confirm and periodically reconfirm the condition and operability of environmental monitoring system when present. All systems are currently operable and in satisfactory condition.	*N/A*	***Asbestos Abatement:*** ***Environmental air monitoring is not required for the asbestos portion of the project.*** *Notes:* • ***K-H EMC must be notified of any change to the scope or approach to the work so the need to environmental monitoring can be re-evaluated.*** • ***This element needs to be assessed for each phase of the project (an issue for future phases of the project).***
28	Verify all programs are in place to support certification from a waste repository. This includes having the programs in place, assay equipment certifiable, sampling and analysis program certifiable, quality assurance documents, and program in place, resources available all findings from previous audits and assessments closed out, and any other requirements of the waste repository in place and ready for certification.	• *Off-site Waste Approval Facilities* • *Waste Certification Oversight Program*	***Asbestos Abatement:*** *Satisfactory—The wastes identified to be generated during asbestos are routine. As long as no additional waste streams are generated, approved programs are in place for Kettleman Hill through Chem Waste, USA Waste, and Nevada Test Site (NTS)*
	ERE CHECKLIST		
29	Verify work planning documents/basis of estimate correctly identified hazards and authorization basis.	• *Preliminary Hazard Analysis (PHA)* • *Integrated Work Control Package (IWCP)*	*Asbestos Abatement: Satisfactory—The project management requested appropriate review for authorization basis.*
30	Verify a Work Authorization Document has been developed and approved, including any required Baseline Change Proposals, which must be approved before work commences.	• *Project Execution Plan* • *Interview with budget personnel* • *Budget documentation* • *Work Authorization Document*	*Asbestos Abatement: Satisfactory—* • *The Work Authorization Document (WAD) has been developed and approved.*
31	Verify funding is approved and allocated.	• *Budget documentation* • *Interview with budget personnel*	*Asbestos Abatement: Satisfactory—* • *The funding for FY1998 is approved.*
33	Verify subcontractor field personnel have documented evidence of required training.	*A review of personnel training records will be conducted in the field.* • *Subcontractor submittals* • *Interview with K-H training personnel*	*Asbestos Abatement: Field oversight required—Verification of training records will be conducted in the field.*

B123 ASBESTOS ABATEMENT CHECKLIST

Item	Checklist	Supporting Evidence	Results
34	**Verify an Integrated Work Control Program (IWCP) work package has been developed.**	• *IWCP for asbestos abatement activities*	***Asbestos Abatement: Satisfactory—IWCP for asbestos abatement has been developed, reviewed, and adequately meets the requirements.***
36	**Verify the development** of a Field Implementation Plan or equivalent: further defines the actions described in the PAM.	• *PEP* • *Asbestos Characterization Report* • *Construction Package for B123* • *SAP*	***Asbestos Phase:*** *Satisfactory—* • *Although a Field Implementation Plan was not prepared for this project, the PEP, Asbestos Characterization Report and Construction Package for 123 Asbestos Abatement meet the intent of the FIP for the asbestos abatement portion of the project.*
37	**Verify** Health and Safety Plan has been written and approved: to address the safety and health hazards of each phase of site operation and specify the requirements and procedures for employee protection.	• *RMRS Health and Safety Plan* • *Asbestos Health and Safety Plan*	***Asbestos:*** *Satisfactory—* • *The Health and Safety Plan for both RMRS and the asbestos removal plan has been approved.*
38	**Verify a** Characterization Report has been developed which determines extent of work, the criteria for sampling, and required analysis of materials.	• *Reconnaissance level characterization report* • *Asbestos characterization report* • *PEP* • *PAM*	***Asbestos Phase:*** *Satisfactory - characterization report and asbestos characterization report, completed by EPA AHERA accredited personnel possessing State of Colorado Certification, have been developed and characterize the extent of work, criteriator sampling, and analysis of material..*
39	Verify radiological controls have been specified.	• *Asbestos abatement IWCP* • *Subcontractor submittals* • *Radiation Work Permit*	***Asbestos Abatement:*** *Satisfactory—Radiological controls have been addressed through the Radiation Work Permit and Integrated Work Control Package.* *Note: Globally, radiation control should be developed and specified earlier in the process. This involvement should be reflected in the IWCP.*

cc: Ben
file

DOE F 1325.8

United States Government

Department of Energy

memorandum

RECEIVED

Rocky Flats Field Office

DEC 17

DATE: DEC 16 1997

REPLY TO ATTN OF: AI:MOE:05459

SUBJECT: Approval to Proceed with Phase 2 of Building 123 Demolition, Asbestos Abatement

TO: Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

Reference: Memo, A. Parker to K. Klein, dtd 12/15/97, 97-RF-06522, Authorization to Proceed with Building 123 Asbestos Abatement

Your request to commence Building 123 Asbestos Abatement is approved based on the completion of the Rocky Flats Field Office Environmental Readiness Evaluation (ERE) Activity Oversight of the Kaiser-Hill ERE. The ERE report is attached.

Keith A. Klein
Deputy Manager for Technical Programs

Attachments:
Assessment Report
Referenced Correspondence

cc w/Atts:
E. Kray, CDPHE
R. Warther, DNFSB
T. Weadock, EH-24
J. Legare, AMEC, RFFO
P. McEahern, AMPA, RFFO
D. Lowe, AME, RFFO
J. Wienand, A&E, RFFO

Assessment Report

Date: December 16, 1997

Assessment ID Number: 98-061-AI-CERCLA, Building 123 Asbestos Abatement ERE

Purpose: To assess the readiness of the Integrating Management Contractor to proceed with work in Building 123 for the second phase of the demolition, asbestos abatement.

Executive Summary: The cooperation of the assessed personnel and their attitude concerning this assessment was positive and commendable. In general, Kaiser-Hill performed a comprehensive Environmental Readiness Review of the asbestos abatement activities planned by the contractor and is performing adequate oversight of the demolition activities in B123. No findings were identified.

Conduct of Assessment: The RFFO assessment was an activity oversight of the Kaiser-Hill ERE conducted from 10 through 16 December 1997 by the five member team who signed below. The assessment was conducted in accord with the Assessment Program Operating Procedure and the Assistant Manger for Environmental Compliance Addendum to the Assessment Procedure for Environmental Readiness Evaluations. The building was visited by the whole team at various times, interviews were conducted, and a number of documents were reviewed. Additional detail is provided in the attached team member observation forms.

The result of the assessment

Kaiser-Hill performed a comprehensive Environmental Readiness Review of the asbestos abatement activities planned by the contractor and is performing adequate oversight of the demolition activities in B123. No findings were identified.

Recommendation: Authorize work to proceed following confirmation of prestart finding correction.

Signed:

Mike Erickson (lead) ________ Brandon Williamson ________

Tom Must ________ Fred Jeager ________

Russell McCallister ________

RFFO F 220.1B
8/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: **Date:** 12/11/97 **Time:** 0900

Assessor: Russell McCallister/RLG/EC/RFFO

(Name/Organization of individual performing assessment activities)

Criteria Evaluating the adequacy of coverage to prevent any releases into the air. Review the Proposed Action Memeorandum, Colorado Air Quality Contol Commission Regualtion No. 3 Air Pollution Emission Notice and Reg No. 8 notification, permit and training. Any specific Applicable or Relevant Appropriate Requirements (ARARs) under the Clean Air Act for Asbestos removal

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Walked through the building to ensure adequate compliance with applicable air regulations and interviews with KH and RMRS personnel.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

Building appears to have adequate controls to prevent unplanned releases into the air. Potential air emissions appear to be below any regulaotry threshold.

Interviews Conducted: *(List Format)*

Mike Putney: Radian, Asbestos abatement is satisfactory according to Mike's observations and his interviews with RMRS Project Management.

Activities Observed: *(List Format)*

Observed preparation for misting of perchloric hoods to minimize risk from explosion. Adequate containment was observed. Adequate plasitc covering on hoods and areas closed off.

Conclusions

Findings:

Everything appears to be in order to prevent an accidental release of contaminents into the atmoshere Asbestos Abatement appears satisfactory. Asbestos requirements are identified as ARARs for the project and implementation is spelled out in specific asbestos removal documents. Asbestos abatement checklist is adequate. Asbestos Abatement Plan has been submitted to CDPHE 7 days prior to starting work (Submittal on December 10, 1997).

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

(See Definitions)

Russell McCallister 12/15/97

Assessor Signature *Date*

RFFO F 220.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: 97-047-AI-CERCLA **Date:** 12/11/97 **Time:** 1000

Assessor: Thomas L. Must

(Name/Organization of individual performing assessment activities)

Criteria Reference 29 CFR 1926, and 29CFR 1910. Toxic and Hazardous Substance, 1926.1101 Asbestos Regulation, of asbestos in all work as defined in 29CFR 1910.12(b), Asbestos removal in demolition, or salvage or structures where as bestos is present.

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

(1) Document review of Asbestos Abtement Plan (asbestos Free Insulation Contracting, Inc) KH assessment report
(2) Interview of Integrator SME , KH and DWRC for above referenced project and subtiers
(3) Walkdown of area (Bld123)
(4) Site Inspection of asbestos removal set-up and removal operation as applicable

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

(1) Abestos Abatement Plan for Bld 123 Decommissioning Project
(2) KH assessment fianl report
(3) Trainiog requirements for Asbestos removal personnel prior and during removal opereation as required.

Interviews Conducted: *(List Format)*

(1) Idustrial Hygienist fo r KH (IMC) Formal Interview
(2) Safety and Health Representative (KH) Formal Interview
(3) Safety and Health Representative (DMRC) Informal Interview
(4) Project Manager (DMRC) Informal Interview

Activities Observed: *(List Format)*

During the wal kdown of Building 123, general construction operations, observed, marked asbestos sampling locations and Class II and Class III ,material for removal located in relation to Bld 123.

Conclusions

Findings:

In the asbestos abatement plan dated 12-1-97, the following deficiencies n the plan were noted:
(1) Reference 7. Description of Work Practices to be Observed by Employees, a minimum of 4air exchanges is required for asbestos removal, ensure the 5.37 is roundd up to 6 fan units to ensure proper air removal(REF 1926.1101(A) (1) . (2) Ref 9. MSDA attachment is missing.(3) Air monitoring plan needs to be attached.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

The KH , S&H team were aware of missing attaqchments and requirements of the submitted Bld 123 Asbestos Plan. This included the necessity requirement to roun up to six air movers to achive the minimum of four room air changes perhour as required.

(See Definitions)

Thomas L Must
Assessor Signature

12-15-97
Date

RFFO F 320.1B
9/18/97 Rev. 0

ASSESSMENT OBSERVATION FORM

Assessment ID Number: **Date:** Dec 11,1997 **Time:**

Assessor: Frederick Jaeger CHP

(Name/Organization of individual performing assessment activities)

Criteria: The radiologicla procedures and criteria in use are consisitant with the hazards in Building 123.

(Briefly describe the criteria or expectations being evaluated. When applicable include reference to criteria source documents, i.e., DOE Order, Site Procedure, etc.)

Approach:

Building walk through, Review of K-H oversight with K-H Radiation Protection representative.

(Briefly describe the assessment approach taken to evaluate this functional area)

Records Reviewed: *(List Format)*

B123 Asbsesto Abatement Checklist.

Interviews Conducted: *(List Format)*

Kevin Daniels (K-H).

Activities Observed: *(List Format)*

Building Walkthrough.

Conclusions

Findings:

The approach taken by K-H Radioloical Protection are adequate. The radiological controls have been corrected as a result of K-H review. No radiological issues were identified during the building walkthrough.

(An individual item that does not meet requirements or performance expectations)

Weaknesses/Strengths:

None Identified.

(See Definitions)

Assessor Signature

12/16/97
Date

CORRES. CONTROL
OUTGOING LTR. NO.

DOE ORDER #.

98-RF 00559

DIST.	LTR	ENC
BENSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BURDGE, LARRY		
CARD, BOB		
HARDING, WYNN		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TILLER, ROBERT		
TUOR, NANCY		
VOORHEIS, GARY		
Crowe, Steve	X	
Bruse, Jill	X	X
Buhl, Tony		
Daniels, Kevin	X	X
Davis, Bob		
Gillen, Bill		
Leonard, Eric		
Miles, Paul	X	X
Miller, John		
Schmalz, Greg	X	X
Steelman, Mark		
alker-Lembke, S.		
ahl, Tim	X	X
odgers, Alan		
DOER, K.	X	X
BARBERO, B.	X	X
BRADFIELD S	X	X
PUTNEY, M.	X	X
SOLLNER, G.	X	X
BOWLES, M.	X	X
NORMAN, P.	X	X
CORRES.CONTROL	X	X
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:		
UCNI		
UNCLASSIFIED	X	X
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:

Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
SJB :twa

RF-46469 (Rev. 1/98)

KAISER•HILL
COMPANY

February 2, 1998 98-RF-00559

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

AUTHORIZATION TO PROCEED WITH BUILDING 123 DEMOLITION - AMP-015-98

Refs: (a) K. A. Klein ltr, 05078, to A. M. Parker, Environmental Readiness Evaluation, June 30, 1997
(b) A. M. Parker ltr, AMP-122-97, to K. A. Klein, Building 123 Cluster Phased Environmental Readiness Evaluation Approach, August 28, 1997

In accordance with reference (a), Kaiser-Hill (K-H) is submitting written notification to the Office of the Assistant Manager for Environmental Compliance informing them that Rocky Mountain Remediation Services (RMRS) is ready to proceed with the demolition phase of the Building 123 Decommissioning Project, with the exception of nine pre-demolition findings identified and listed within the attached report. Pre-demolition findings consist of documentation identified in the work control system as prerequisites to demolition that will be available immediately prior to the start of demolition and were not available for this assessment.

As discussed in reference (b), Building 123 Cluster Phased Environmental Readiness Evaluation (ERE) Approach, efforts for the Building 123 Decommissioning Project will be conducted in three phases: (1) equipment stripout, (2) asbestos abatement, and (3) demolition. Oversight of the equipment stripout and asbestos abatement phases has been completed. This assessment focused on the third and final phase, demolition.

Attached are the results of the K-H oversight of the Building 123 demolition phase of the project. The graded approach was applied and credit was taken for documents reviewed and interviews conducted in the equipment stripout and asbestos abatement phases. The overall conclusion of the review team was that the proper controls are in place to safely perform the activities. Pre-demolition findings closeout and field oversight of project control implementation will be conducted in a joint effort with the DOE ERE team just prior to the commencement of field work. Oversight activities related to Building 123 demolition will be performed by K-H Closure Projects as the work progresses.

In accordance with reference (a), K-H is requesting written notification that the Building 123 project is authorized to commence demolition.

Kaiser-Hill Company, L.L.C.
Courier Address: Rocky Flats Environmental Technology Site, State Hwy. 93 and Cactus, Rocky Flats, CO 80007 • 303.966.7000
Mailing Address: P.O. Box 464, Golden, Colorado 80402-0464

If you have any questions on this matter, please contact Jill Bruse at Extension 4807 or pager 212-3377.

Alan M. Parker

Alan M. Parker
Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

SJB:rwa

Attachment:
As Stated

cc:
Orig. and 1 cc - K. A. Klein

CLOSURE PROJECTS

ENGINEERING AND INTEGRATION

ASSESSMENT OF

B123
DEMOLITION
97-0148-KH

January 30, 1998

Sue Bruse

S. J. Bruse, Assessment Lead

Closure Project's Assessment of B123 Demolition Phase

1.0 Summary

Kaiser-Hill Closure Projects Integration has oversight responsibility of the Rocky Mountain Remediation Services (RMRS) Building 123 (B123) demolition phase of the B123 decommissioning project. This assessment was performed in January 1998. The decommissioning of B123 is conducted in three phases, as follows:

- Equipment stripout,
- Asbestos abatement, and
- Demolition

The activities summarized here focused on the third and final phase, demolition. Assessments of the equipment stripout and asbestos abatement phases have been completed. The review team evaluated RMRS and subcontractor documentation prepared that defines and controls:

- the work required,
- the training of on-site individuals responsible for the removal activities, and
- the overall readiness of RMRS and their subcontractors to perform the demolition activities.

The graded approach was applied and credit was taken for documents reviewed and interviews conducted in the previous phases, equipment stripout and asbestos abatement.

It is determined that the proper controls are in place and the B123 demolition phase of the project is ready to proceed, with the exception of nine pre-demolition findings identified and listed in Section 4.0 below. Pre-demolition findings consist of documentation identified in the work control system as prerequisites to demolition that will be available immediately prior to the start of demolition and were not available for this assessment. Activities will commence when work authorization notification is received from DOE.

Oversight of B123 project control implementation will be conducted in the field for asbestos abatement requirements and will be conducted in concert with DOE.

2.0 Introduction

K-H oversight consisted of an evaluation of the documentation prepared to define and control the project, the training of on-site individuals responsible for the removal activities, and the overall readiness to perform the activities. A review team, comprised of the following personnel, was assembled:

Jill Bruse	Closure Projects Engineering and Integration

Shawn Bradfield	Health & Safety
Kevin Daniels	Radiological
Paul Miles	Quality Assurance
Mike Putney	Air Quality
Greg Schmalz	Decontamination & Demolition and Fire Protection
Greg Sollner	Environmental Compliance/Waste

3.0 Assessment Methodology

The evaluation followed the guidance contained in DOE letter, Keith Klein to Alan Parker, AI:JG:05078, dated June 30, 1997, *Environmental Readiness Evaluation*. A checklist was developed to ensure that appropriate areas were evaluated. The completed checklist is contained as Attachment 2.

The evaluation included a review of the documentation prepared to support the project activities, interviews with project personnel and a review of on-site training plans and records. The three major areas, (1) Project documentation review, (2) Training and personnel readiness, and (3) Project personnel interviews, are discussed below.

3.1 Project Documentation Review

The documentation reviewed addressed the activities and hazards expected to be encountered. Issues regarding documentation identified during the course of the assessment were corrected. Major documentation reviewed included but was not limited to:

- Closeout Radiological Survey Plan
- Demolition Plan
- Health and Safety Plan
- Integrated Work Control Package
- Master Activity List Approval
- Preliminary Hazard Analysis
- Project Execution Plan
- Proposed Action Memorandum
- Sampling and Analysis Plan
- Subcontractor submittals
- Training documentation
- Waste Management Plan
- Work Authorization Documents

3.2 Training and Personnel Readiness

Denver West Remediation Contractor (DWRC) and their subcontractors group training records for the employees utilized in the demolition of B123 will be verified prior to the start of work in the field. Rosters for required orientation, pre-evolutionary briefings, weekly safety meetings, and tool-box safety meetings will also be reviewed. Delaying the briefing and corresponding review is preferred since the briefings will not be occurring until just prior to the start of the field work and personnel are not currently on site.

3.3 Project Personnel Interviews

K-H and DWRC Building 123 project personnel were interviewed using questions on the checklist. The personnel displayed excellent understanding of the demolition phase. Demolition process requirements that are not completed at present are being addressed or contingency plans are in place.

4.0 Pre-Demolition Findings

Pre-Demolition findings and observations identified during the course of this assessment are as follows:

Letter submit

PAM/draft

1. **The Demolition Permit:** The demolition permit has not been issued by CDPH&E. It will be issued when the building is certified as asbestos-free by the asbestos abatement contractor. The permit should be issued just prior to demolition.
2. **The Final Radiation Survey:** Radiological survey collection, required review, and analysis has to be completed to determine that demolition is ready to proceed without radiological controls. The final radiation survey verifying Building 123 to be radiation clean should be completed just prior to demolition.
3. **Radioactive Equipment Removal:** Known radioactive material and equipment have not been removed to allow demolition to proceed without requiring radiological controls. Part of Final survey
4. **Slab Radioactivity Contingency Plan:** Currently, contingency plans have not been prepared to ensure that any remaining radioactivity in the slab will not be exposed during the demolition process. not started
5. **Activity Hazard Analyses (AHAs):** AHAs are to be produced by the subcontractor conducting the work. Currently, the subcontractor has not mobilized on Site. Some examplAHAs must be reviewed by the oversight team prior to granting authorization to proceed.
6. **The Demolition Plan:** The Demolition plan must be ~~finalized~~ then submitted for approval by CDPH&E. A final draft of the demolition plan and the proposed revisions were reviewed and found satisfactory by the oversight team. It is anticipated that CDPH&E will approve without comment. maybe rev. 3
7. **Training Records:** The demolition subcontractor has not mobilized nor identified the workers to conduct the demolition activities. Training records must be reviewed prior to commencing activities.
8. **Qualification Records:** Currently, DWRC cannot provide documentation indicating the qualifications of the R&R equipment operator and the other R&R personnel.
9. **Safety Responsibility:** DWRC cannot provide documentation that clearly defines and effectively describes the line management responsibility for control of safety. During the interview process, Construction Management stated that this will be part of the Site Indoctrination for the Building 123 demolition personnel.

pg. 14 demo plan scrubbers

Closed

Observations:

Tues/ 1:00pm close out.

1. RMRS should demand a rigorous lessons learned program from all subcontractors via the statement of work, as well as be eager to utilize the current Site lessons learned program as part of the Integrated Safety Management philosophy.
2. DWRC is understaffed in the QA department. The amount of presence on site is questionable.

110

Demolition B123
Oversight Results

02/02/98

Item	Checklist	Assign'ee	Supporting Documentation	Results
	CORE REQUIREMENTS			
1 ✓	Verify compliance with environmental regulatory requirements such as regulations and regulator approved project documents.	Sollner	• Proposed Action Memorandum (PAM) • Project Execution Plan (PEP) Waste Management Plan • Administrative Record • Demolition Plan	**Demolition Phase - Satisfactory:** Environmental regulatory requirements have been satisfied through approved project documents. **Note:** An issue regarding several minor modifications to the PAM has been identified. The project should expedite the submission of these changes which will ensure consistency with the intended project scope. Project Management, has been briefed on the issues regarding these changes. Project Management has initiated the change process to ensure the timely update of the PAM as appropriate.
2 ✓	Verify that the mitigation of fugitive dust emissions generated from demolition operations and the project ambient air monitoring requirements are identified in the Building 123 Cluster demolition plan for Building 123.	Putney	• Demolition Plan	**Demolition Phase- Pre-Demolition Finding:** The demolition plan has not been finalized nor has it been approved by CDPH&E.
3 ✓	Verify that the use of any fossil fuel-fired generators or compressors meet applicable inventory reporting and permitting requirements of CAQCC Regulation No. 3.	Putney	• Commitment letter from B123 Project Management to K-H Air Quality Management KAD -006-98	**Demolition Phase- Satisfactory:** The commitment letter KAD-006-98 clearly supports proper inventory, reporting and permitting requirements of fossil fuel fired generators and compressors. Implementation of this commitment will be field confirmed.
4 ✓	Verify that exhaust emission from any fossil fuel-fired generators or compressors are below the 20% limit mandated in CAQCC Regulation No. 1	Putney	• Analytical Report of Visible Emission • Commitment letter from B123 Project Management to K-H Air Quality Management	**Demolition Phase- Satisfactory:** The fossil fuel fired generators and compressors currently in use at the B123 site have been reported to Air Quality Management. Implementation of this commitment on future generators and compressors brought on Site will be field confirmed.

Item	Checklist	Assign'mt	Supporting Documentation	Results
5 ✓	Verify water collection requirements are met. **Verify the relationship** between Fire Protection and the project has been established.	Schmalz	• Verbal Conversation with DWRC Project Manager - 1/22/92 • Commitment letter from B123 project management to the fire department scheduling a coordination meeting on the changing conditions	**Demolition Phase- Satisfactory:** Fire Department and project relationship to be documented with memorandum. Fire Protection Water to be terminated during Stripout phase.
6 ✓	Verify that waste streams which will be generated during demolition have been accurately identified. Verify that identified waste streams will be dispositioned to K-H list approved off-Site disposal facilities.	Sollner	• B123 Reconnaissance Level Characterization Report (RLCR). • Waste Generator Instructions for B123 • Waste Stream and Residue Identification and Characterization (WSRIC). Decontamination and Decommissioning Building Book • List of disposal facilities. • Subcontractor documents. • PAM	**Demolition Phase - Satisfactory:** Demolition phase waste streams have been accurately identified and characterized. Demolition waste is strictly an industrial/sanitary waste which is scheduled for disposal at a KH approved facility. Building 123 stripout and asbestos abatement phases includes the management and disposition of the Building 123 radiological, hazardous, TSCA and asbestos waste streams identified in the RLCR. The final radiological surveys of 123 will result in release of the building as an industrial waste upon demolition. Waste Generator Instructions have been developed and approved for this phase of D&D. However, the potential exists for the discovery of a previously unidentified waste stream during actual building demolition. The 123 Waste Management Plan recognizes this potential and requires management of these wastes, should they occur, in accordance with applicable procedures. ***Note: In the event a previously unidentified waste is discovered during building demolition, KH must be notified immediately to assure compliant management and to verify the proposed disposal facility is KH approved.***

Demolition B123
Oversight Results

02/02/98

Item	Checklist	Assignment	Supporting Documentation	Results
7	Verify that modifications and additions to the Building 123 decision document (PAM) have been reviewed.	All	• Proposed Action Memorandum (PAM)	**Demolition Phase- Satisfactory:** The PAM has not undergone any revisions. Proposed minor modifications are being prepared.
8	Verify that there is a contingency plan to address unknown hazards. Verify a routing and emergency contingency plan, including program record has been established and implemented	Bradfield	• Commitment letter from B123 project management to the fire department scheduling a coordination meeting on the changing conditions	**Demolition Phase- Satisfactory:** A contingency plan is established. Proper implementation will be verified in weekly walkdown audits.
9	Verify training and qualification programs for operation and operation support personnel have been established and documented. (Training and qualification program encompasses the range of duties and activities required to be performed.)	Miles	• Training Qualifications for B123 Strip-out & Demolition, Training Matrix	**Demolition Phase: Pre-Demolition Finding:** Training for R&R International personnel and some current DWRC labor personnel will not occur until 2-3 day before commencement of demolition activities.
10	Verify the level of knowledge of operations and operation support personnel is adequate based on interviews of personnel	Miles	• Training Qualifications for B123 Strip-out & Demolition, Training Matrix	**Demolition Phase: Pre-Demolition Finding:** Training for R&R International personnel and some current DWRC labor personnel will not occur until 2-3 day before commencement of demolition activities.
11	Verify safety documentation is in place that describes the "safety envelope" of the project. The safety documentation should characterize the hazard/risks associated with the project and should identify mitigative measures that protect workers and the public form those hazards/risks. Safety system and system essential to worker and public safety are defined and a system to maintain control over the project.	Bradfield	• 123 Health and Safety Demolition Plan • 123 Health and Safety Program Plan • HSP Manual • Section 01700 contract specification • AHA criteria	**Demolition Phase - Satisfactory:** The supporting documents provide a safety envelope for the protection of employees and the environment. Implementation of the plans will be verified through continued observation and audits of the project.

Item	Checklist	Assign'mt	Supporting Documentation	Results
12 ✓	Verify a process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations, and the operating contractor.	Miles	• DWRC Letter dated 1/20/98, Procedures for DWRC Demolition Subcontractor-R&R International, Inc., 98-DWRC-086 • DWRC procedures: 1. CONTROL OF NONCONORMANCES, #15.2, R0 2. CORRECTIVE ACTION, #16.1, R1 3. Subcontract No. SC0023 between DWRC & R&R International, Inc.	**Demolition Phase - Satisfactory:** The referenced letter states that R&R will work in accordance with DWRC project documents such as their QA Project Description and Quality Procedures. These documents are in place and have been approved by KH and RMRS QA organizations. DWRC Construction Management stated Job Briefings will be a key element in each days activities. Nonconforming items that can be addressed immediately with management field instructions will be corrected as soon as identified.
13 ✓	Verify management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure operational support services are adequate for safe operations.	Miles	• Demolition Plan for Building 123 Demolition Project	**Demolition Phase - Satisfactory:** The Management Plan for demolition is in place. The demolition process and equipment to be used are described in the plan. The numbers of personnel were provided during the interview with the DWRC Construction Management. **Demolition Phase - Pre-Demolition Finding:** Currently, DWRC can not provide documentation that documents the qualifications of the R&R equipment operator and the other R&R personnel.
14 ✓	Verify that functions, assignment, responsibilities, and reporting relationships are clearly defined and effectively implemented with line management responsibility of control of safety.	Miles	• Demolition Plan for Building 123 Demolition Project	**Demolition Phase - Pre-Demolition Finding:** Currently, DWRC can not provide documentation that clearly defines and effectively describes the line management responsibility of control of safety. During the interview process, Construction Management stated this will be part of the Site Indoctrination for the 123 demolition personnel.

Item	Checklist	Assignment	Supporting Documentation	Results
15 ✓	Lessons learned from previous similar projects are adequately addressed.	Miles	• Demolition Plan for Building 123 Demolition Project	**Demolition Phase - Marginal:** No formal lessons learned program exist. But, *during the interview* process, Construction Management stated an example of a lessons learned that is to be used in the Site Indoctrination. Management stated that it will be written up and used as a Lessons Learned. **Concern**: RMRS should require a rigorous lessons learned program from all subcontractors as well as be eager to utilize the current Site lessons learned program as part of the Integrated Safety Management philosophy.
16 ✓	Verify that a systematic review of the facility's conformance to applicable DOE Orders has been performed, any nonconformance have been identified, and schedules for gaining compliance have been justified in writing and formally approved, or waivers granted.	Bradfield	• RMRS memo B123 Project Management to file 1/20/98 Review of DOE orders for applicability for application to B123 Demolition	**Demolition Phase - Satisfactory:** A DOE Order search was completed and found satisfactory.
17 ✓	Verify a program is in place to confirm and periodically reconfirm the condition and operability of environmental monitoring system when present.	Bradfield	• Demolition Plan, Ambient Air Monitoring section	**Demolition Phase - Satisfactory:** The existing site radioactive Ambient Air Monitoring Program (RAAMP) sample network will be utilized for ambient air monitoring during the Building 123 cluster demolition. The Building 123 cluster demolition process will not be a significant source of radionuclide emissions, and will not warrant enhanced radioactive monitoring.
18 ✓	A Work Authorization Document developed and approved, including any required Baseline Change Proposals, which must be approved before work commences.	Bruse	• Work Authorization Documents (WAD) • Baseline Change Proposals (BCP)	**Demolition Phase - Satisfactory:** Work Authorization Document and Baseline Change Proposals have been developed and approved.

Item	Checklist	Assign'mt	Supporting Documentation	Results
19	Verify characterization has been performed to determine extent of work.	Sollner	• B123 Reconnaissance Level Characterization Report (RLCR). • Waste Generator Instructions for B123 • Waste Stream and Residue Identification and Characterization (WSRIC). Decontamination and Decommissioning Building Book • List of disposal facilities. • Subcontractor documents. • PAM	**Demolition Phase - Satisfactory:** Demolition phase waste streams have been accurately identified and characterized. Demolition waste is strictly an industrial/sanitary waste which is scheduled for disposal at a KH approved facility. Building 123 stripout and asbestos abatement phases includes the management and disposition of the Building 123 radiological, hazardous, TSCA and asbestos waste streams identified in the RLCR. The final radiological surveys of 123 will result in release of the building as an industrial waste upon demolition. Waste Generator Instructions have been developed and approved for this phase of D&D. However, the potential exists for the discovery of a previously unidentified waste stream during actual building demolition. The 123 Waste Management Plan recognizes this potential and requires management of these wastes, should they occur, in accordance with applicable procedures. *Note: In the event a previously unidentified waste is discovered during building demolition, KH <u>must</u> be notified immediately to assure compliant management and to verify the proposed disposal facility is KH approved.*

Item	Checklist	Assign'me	Supporting Documentation	Results
20 ✓	Verify Integrated work Control program work package(s) are developed and adequate.	Schmalz	• Demolition Plan for Building 123 Demolition Project prepared by DWRC • Rocky Flats Construction Transmittal dated 12/24/97 • Construction Package B123 Deactivation, B113, 114, 123 & 123S Demolition • IWCP	**Demolition Phase - Satisfactory :** The demolition Integrated Work Control Packages were reviewed and found satisfactory. **Note:** There is a open item regarding the planning, schedule, and performance of the work associated with the earlier closure of the Process Waste Underground Lines and Sumps located in Rooms 156, 157, & 158. These items are currently associated with the IHSS for B123 and RCRA 40. This assessment does not include this work.
21 ✓	Verify that the Sampling Analysis Plan (SAP) developed defines the criteria for sampling and analysis of material.	Sollner	• 123 IHSS 121 and 148 Sampling and Analysis Plan	**Demolition Phase - Satisfactory:** The Bldg. 123 PAM does state that the SAP will be finalized prior to award of the decommissioning contract. However, the project as is discussed in the PAM is planned such that the sampling and characterization is a sequential activity to the completed stripout, asbestos removal, and building demolition. As discussed in item #1 above, project management is proceeding with appropriate minor modifications to the PAM. Completion of the SAP is planned prior to the commencement of sampling and characterization activities associated with the 123 Under Building Contamination and the 121 and 148 IHSSs.
22 ✓	Verify that findings are addressed from previous phases of the environmental readiness evaluations	Daniels	• Letter dated 1/27/98, AMP-007-98 Building 123 Stripout Environmental Readiness Evaluation (ERE) Post-Start Findings, Assessment ID Number 97-047-AI-CERCLA.	**Demolition Phase - Satisfactory:** The post-start findings have been addressed and documented in a letter dated 1/27/98, AMP-007-98.

Item	Checklist	Assignment	Supporting Documentation	Results
23	Verify a Quality Assurance presence is on the project	Miles	• Demolition Plan for Building 123 Demolition Project • DWRC Letter dated 1/20/98, Procedures for DWRC Demolition Subcontractor-R&R International, Inc., 98-DWRC-086	**Demolition Phase - Satisfactory:** The referenced letter states, "R&R will work in accordance with the latest revision to DWRC Quality Assurance Project Description..." During the interview process, the QA Manager for DWRC stated he will be a presence at the project site. **Concern:** DWRC is understaffed in the QA department. The amount of presence in the field is questionable.
24	Verify completed surveys are properly documented and are adequate for survey plan requirements.	Daniels	• none	**Demolition Phase - Pre-Demolition Finding:** Final surveys have not been completed. Deficiencies have been identified with the knowledge of RCT's performing the surveys concerning the release limits being used. Fixed contamination locations are not being adequately documented.
25	Verify controls for maintaining status of area where final surveys have been completed are adequate.	Daniels	• none	**Demolition Phase - Pre-Demolition Finding:** Access to rooms undergoing final survey was not adequately controlled. No methodology was identified to ensure that if an inadvertent spread of contamination should occur during stripout that it would be identified and its effects on final surveys evaluated. A DOE Preliminary Notification PN-123-DAP-002 has not been closed out concerning this issue.
26	Verify radiological survey plans are determined and implemented. Verify that plans are developed from industry recognized standards	Daniels	• MARSSIM (draft) • Closeout Radiological Survey Plan	**Demolition Phase - Satisfactory: MARSSIM** statistical Methodologies for determining the number of survey points have been utilized.

CORRES. CONTROL
OUTGOING LTR. NO.
DOE ORDER #.

98-RF 01203

DIST.	LTR	ENC
BENSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BURDGE, LARRY		
CARD, BOB		
HARDING, WYNN		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TILLER, ROBERT		
TUOR, NANCY		
VOORHEIS, GARY		
Crowe, Steve	X	
Bruse, Jill	X	
Buhl, Tony		
Daniels, Kevin	X	
Davis, Bob		
Gillen, Bill		
Leonard, Eric		
Miles, Paul	X	
Miller, John		
Schmalz, Greg	X	
Steelman, Mark		
er-Lembke, S.		
, Tim	X	
Rodgers, Alan		
PUTNEY, MIKE	X	
SOLLNER, GREG	X	
BRADFIELD, SHAWN	X	
DORR, KENT	X	
BOWLES, MIKE	X	
NORMAN, PAUL	X	
BARBERO, BRIAN	X	
CORRES.CONTROL	X	
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:

UCNI	
UNCLASSIFIED	X
CONFIDENTIAL	
SECRET	

AUTHORIZED CLASSIFIER SIGNATURE:
Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
:rwa

RF-46469 (Rev. 1/98)

KAISER•HILL
COMPANY

April 16, 1998

98-RF-01203

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

CLOSE OUT OF BUILDING 123 PRE-START FINDINGS - AMP-040-98

Ref: (a) K.A. Klein ltr, 05078, to A. M. Parker, Environmental Readiness Evaluation, June 30, 1997

Kaiser-Hill (K-H) is submitting written notification to the Office of the Assistant Manager for Environmental Compliance informing them that K-H has satisfactorily closed-out seven of the nine pre-start findings identified by the team. Pending comment resolution on the final radiation survey and State approval of the demolition plan, K-H will be ready to proceed with the demolition phase of Building 113, Building 114 and the east wing of Building 123 up to the expansion joint except for the wall adjacent to Rooms 137 and 138. This notification excludes the north and west wings.

Listed below is a summary of the pre-start findings. Documentation for closure of each finding has been presented to the DOE Readiness Review Team.

1. **The Demolition Permit:** The demolition approval notice has been received by CDPH&E for the east wing.
2. **The Final Radiation Survey:** A radiological survey was conducted to determine if east wing demolition is ready to proceed without radiological controls. The final radiation survey has been reviewed and comment resolution is pending.
3. **Radioactive Equipment Removal:** Known radioactive equipment has been removed to allow demolition to proceed without requiring radiological controls.
4. **Slab Radioactivity Contingency Plan:** A contingency plan has been prepared to ensure that any remaining radioactivity in the slab will not be exposed during the demolition process.
5. **Activity Hazard Analyses (AHAs):** A representative sample of AHAs has been satisfactorily produced by the subcontractor conducting the work.
6. **The Demolition Plan:** The Demolition Plan has been finalized and submitted to CDPH&E.
7. **Training Records:** The demolition subcontractor training records have been reviewed.
8. **Qualification Records:** The qualifications of the R&R equipment operator personnel will be verified in the field.
9. **Safety Responsibility:** DWRC has provided documentation that clearly defines and effectively describes the line management responsibility for the control of safety.

In accordance with reference (a), K-H is requesting written notification that the Building 123 decommissioning project is authorized to commence demolition. Separate authorization will be required for demolition of the north and west wings of Building 123.

If you have any questions on this matter, please contact Jill Bruse at extension 4807 or pager 212-3377

Alan M. Parker

Alan M. Parker
Vice President
Closure Projects Integration
Kaiser-Hill Company, L.L.C.

SJB:rwa

Original and 1 cc - K. A. Klein

cc:
Mike Erickson

DOE F 1325.8

United States Government

Department of Energy

memorandum

Rocky Flats Field Office

DATE:

REPLY TO ATTN OF: AMEC:ECD:MOE:03671

SUBJECT: Approval to Proceed with Building 123 Demolition

TO: Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L. L. C

Reference: Letter, 98-RF-00559, dtd 2/2/98, subject as above.
Letter, 98-RF-01203, dtd 4/16/98, subject as above.

Your request to commence Building 123 Demolition is approved for Building 114 and the east wing of Building 123 up to the expansion joint except for the wall adjacent to Rooms 137 and 138. This authorization excludes the north and west wings. The Rocky Flats Field Office Environmental Readiness Evaluation (ERE) team will continue to monitor the project to ensure that start-up is smooth and that the post-start-up findings are closed.

Keith A. Klein
Deputy Manager for Technical Programs

Attachments:
Assessment Report
Referenced Correspondence

cc w/Atts:
E. Kray, CDPHE
R. Warther, DNFSB
T. Weadock, EH-24, HQ
J. Legare, AMEC, RFFO
M. Weis, AMPA, RFFO
D. Lowe, AME, RFFO
B. Fitch, ER/WM, RFFO

Date: February 10, 1998

Assessment ID Number: 98-085-AI-CERCLA, Building 123 Demolition ERE

Purpose: To assess the readiness of the Integrating Management Contractor to proceed with work in Building 123 for the demolition of Building 123.

Executive Summary: The cooperation of the assessed personnel and their attitude concerning this assessment was positive and commendable. In general, Kaiser-Hill performed a comprehensive Environmental Readiness Review of the demolition activities planned by the contractor and is performing adequate oversight of the demolition activities in B123. Two pre-start findings were identified in addition to the nine pre-demolition findings identified in the KH ERE. The findings identified are; B123 Project management has not adequately identified and addressed removal of cabling within electrical conduit that is connected to the building prior to demolition, several safety related documents need review prior to implementing, the Demolition Permit must be issued by the Colorado Department of Public Health and Environment (CDPHE), the final radiation survey completed and accepted by RFFO, all radioactive equipment removed, a Radioactivity Contingency Plan developed and accepted, Activity Hazard Analyses developed, the Demolition Plan approved by CDPHE, Training records for the subcontractor reviewed, qualifications for the subcontractor personnel reviewed, and the responsibility for safety identified by name for the subcontractors. These findings must be corrected and approved prior to starting demolition.

Conduct of Assessment: The RFFO assessment was an activity oversight of the Kaiser-Hill ERE conducted from 3 through 10 February 1998 by the seven member team who signed below. The assessment was conducted in accordance with the Assessment Program Operating Procedure and the Assistant Manger for Environmental Compliance Addendum to the Assessment Procedure for Environmental Readiness Evaluations. The building was visited by team members at various times, interviews were conducted, and a number of documents were reviewed.

The result of the assessment

Kaiser-Hill performed a comprehensive Environmental Readiness Review of the demolition activities planned by the contractor and is performing adequate oversight of the demolition activities in B123. Two pre-start findings were identified in addition to the nine pre-demolition findings identified in the Kaiser-Hill ERE report. The findings identified by KH are; the Demolition Permit must be issued by the Colorado Department of Public Health and Environment (CDPHE), the final radiation survey completed and accepted by RFFO, all radioactive equipment removed, a Radioactivity Contingency Plan developed and accepted, Activity Hazard Analyses developed, the Demolition Plan approved by CDPHE, Training records for the subcontractor reviewed, qualifications for the subcontractor personnel reviewed, and the responsibility for safety identified by name for the subcontractors. These findings must be corrected and approved prior to starting demolition.

Prestart Findings (must be corrected to DOE satisfaction prior to start of work):

- B123 Project management has not adequately identified and addressed removal of cabling within electrical conduit that is connected to the building prior to demolition. This condition was not addressed in any of the documents reviewed. A potential exists for degradation of alarm, telephone, and/or Life, Safety, Disaster Warning (LSDW) systems if the cabling is left in place and then removed as debris during the demolition process. Project management shall demonstrate that sufficient controls are in place for identifying and removal of associated cabling prior to demolition of the building.
- The completed bracing plan, activity hazard analyses, hoisting and rigging checklist, and lifting plan will need DOE review prior to commencement of the associated activities. These reviews may be concurrent with the KH reviews.

Post-Start Findings (must be corrected but not prior to the start of work in the field):

- The following comments to FB0410-03-1; B123 Demolition, regarding PPE and reference to source of training requirements were identified as safety concerns and should be resolved. IWCP FB0410-03-1; B123 Demolition, Section 7: PPE lacks detail and does not meet the intent of IWCP-3. The note allows for changing the document if additional PPE is needed. The following PPE requirements are in the DWRC HSP:
  - **3.1**: Specific PPE required at all times are hard hat, safety glasses, and safety shoes. Additional PPE to be specified in AHA.
  - **4.0**: PPE is more specific that safety glasses must have side shields. Orange vests for proximity to vehicle traffic or heavy equipment, and leather gloves when handling debris. It is not clear why minimum PPE of DWRC HSP is not included. As written work cannot begin if PPE is added, until IH&S concurs, an unnecessary work delay.
- The following comments to the Demolition Plan regarding LO/TO during demolition and the absence of LO/TO requirements in FB0410-03-1 should be resolved. Demolition Plan, Page 9, section 2.2.2 Requires the following: Steam and gas utilities on rack to be LO/TO during demolition [for original east-north wing]. The ability to install the LO/TO for this utility rack will be dependent on the weather, because LO/TO of steam and condensate stops flow to B112, 111, and 115. The installation of this LO/TO requires the support of another RFETS organization and they have not been identified in the work package under "notifications". It appears that this LO/TO issue has not been discussed with DCI Utilities, and clearly this LO/TO would control DWRC ability to demolish the East wing of the building.
  - Demolition Plan, Page 13, section 3.3: Isolating, LO/TO of utilities specific words reference direction provided by IWCP and then lists systems such as sanitary sewer and lawn sprinkler. Again the IWCP package makes no reference to these LO/TO requirements. Furthermore, it is not clear how LO/TO of the sanitary sewer system would be accomplished. Also, HSP 2.08 the local LO/TO procedure does not require LO/TO for domestic water (i.e., lawn sprinklers). It is not expected that the contract specification recognize HSP 2.08 requirements, however the IWCP package should properly define LO/TO requirements.

- KH should identify actions or plans to prevent the recurrence of the RFFO identified pre-start finding for future D&D projects.
- KH and RMRS should identify actions or plans for technical accuracy review of IWCP work package prior to it's use for future D&D projects. In this project the work package was written in September 1997 and will be used in March 1998.
- KH and RMRS should evaluate the process for maintaining multiple inter related documents such that they accurately reflect building conditions (e.g., IWCP, Demolition Plan, and Contract Specifications).

Observations (provided for information or action as Kaiser-Hill as deems appropriate):

- Table 4-1 of the Demolition Plan identifies approximately 3,500 cubic yards of sanitary waste to be disposed of by USA Waste. Interviews revealed that the current skips (waste removal containers) are not designed to handle the battering and beating incurred by dumping concrete. The current skips may be severely damaged requiring DOE/Kaiser-Hill to purchase this equipment thus generating further waste. Based on the amount of debris and the number of skips needed for removal, it is anticipated that approximately 650 round trips will be required to remove all the demolition debris. Logistical problems with inadequate equipment and an insufficient number of drivers could create a bottleneck during the critical cleanup schedule. Contract requirements should address the use of rock skips and additional drivers. (Weakness)
- The demolition Plan, specification 02050, and FB0410-03-1 do not accurately reflect the work that will be accomplished during demolition. Some work identified is currently being performed. (Weakness)
- Project management did not recognize the need to control the disconnection of cabling within conduit connected to B123. (Weakness)
- It appears that the job site walkdown process during IWCP preparation did not recognize the need to evaluate cabling within electrical conduit external to the building. (Weakness)
- The Traffic Plan for Building 123 Demolition Project states that access to the Medical Center, Building 122, will be maintained from the north. The Plan further states that "Problems with access to Building 122 will be addressed as necessary during the demolition sequence." If access is being maintained from the north, what further problems are anticipated? Potential problems should be identified and addressed prior to commencement of demolition. (Weakness)
- Environmental regulatory requirements have been met for start-up of the demolition phase, pending completion of the pre-demolition findings identified the K-H report "Closure Project's Assessment of B123 Demolition Phase". Additional environmental requirements may apply during demolition.
- Section 7 of the Work Control Package identifies personnel protective equipment (PPE) listed as the minimum required, yet the subsection for PPE only identifies equipment as required by area postings and the RWP. All radiological decontamination requiring an RWP will be completed prior to building demolition; therefore, why the requirement for an RWP during the demolition phase? Since PPE requirements are identified, at a minimum, in the Demolition Plan, those requirements

should also be identified in the Work Control Package to facilitate review by workforce personnel.

- Section 2.3.5 Waste Handling of the Statement of Work identifies Specifications 01610 and 02050 as providing detail on the management of waste. This subsection further identifies that the general requirements for disposal of various types of generated waste for this project are found in Section 2.4. Section 2.4 is not in the Statement of Work. Recommend removal of this statement or include as an addendum or revision.
- Revisions to the Demolition Plan are not identified with appropriate revision bars, making comparisons to earlier editions of the Plan difficult. Recommend that future documentation contain this provision.
- The KH team should evaluate the effectiveness and value of having several subcontractors on contaminated buildings. It may be more efficient to have on-site personnel trained to perform the work.
- The principles of Integrated Safety Management have been incorporated into the B123 demolition project.
- The KH project manager is very involved in the project on a daily basis and the KH safety representative attends the Plan of the Day every day and makes tours through the work site at least weekly. (Strength)
- KH has been taking the proper corrective actions when problems are found. Workers are constantly being trained and briefed on what to expect and what actions to take when they find something unexpected. (Strength)
- Project management took proper actions to address cabling in conduit when this discrepancy was identified. (Strength)
- The subcontractors management have demonstrated positive control of work activities, controlling unplanned events, and an appropriate level of involvement to ensure that organizational commitments to safety are met. (Strength)
- Production meetings and pre-evolutionary briefs are thorough, conducted in accordance with COOP requirements, and have an appropriate level of work force interaction/participation. (Strength)

Signed:

Mike Erickson (lead) ____________ Brandon Williamson ____________

Jon Dion ____________ Eva Bryson ____________

Larry Maghrak ____________ Joe Rau ____________

RECEIVED
MAY 8 1998

KAISER - HILL
COMPANY

INTEROFFICE MEMORANDUM

DATE: May 6, 1998

TO: Jill Bruse, Engineering and Integration, Building 130, X4807
Vern Guthrie, Rocky Mountain Remediation Services, Building T130F, X7419

FROM: Kent Dorr, D&D Programs, Building 130, X6034

SUBJECT: RESPONSE TO DOE POST START ASSESSMENTS FOR THE BUILDING 123 DECOMMISSIONING PROJECT - KAD-038-98

Please find the following responses to the post start assessments received from DOE concerning the Building 123 Decommissioning Project. The responses have been reviewed and commented on by Larry Maghrak of DOE.

Where appropriate, the responses and actions taken by the project team will be included in the Lessons Learned Document of the Final Project Close-out Report.

- Personal Protective Equipment (PPE) is covered in the specific Activity Hazards Analysis (AHA) for the work tasks. General PPE is required for all personnel when inside the controlled work site fence. PPE is covered during the daily pre-evolution briefing. PPE can be added to the prerequisites section of the Integrated Work Control Program (IWCP) package. There have been no work delays or safety issues encountered as a result of not having the correct PPE for the work as identified.

- Lock Out/Tag Out (LOTO) for the Building 123 is managed through the IWCP for the project. Support organizations for LOTO do not need to be identified by company name, but a point of contract should be referenced in the package. The correct organizations are contacted to assist and work the necessary tasks needed to support LOTO. Coordination is always an important factor, and this needs to be verified, not assumed. The IWCP package should not define the LOTO requirements. The LOTO procedure defines the requirements, and there will be no deviation from a controlled procedure. The IWCP package references the procedure, and this procedure is a contractual document that Denver West Remediation and Constructors shall follow.

- Kaiser-Hill will continue to seek suggestions, comments, and the opinions of project team members. RFFO was a welcomed member to the project team, and their input will be asked for on future projects.

- Kaiser-Hill understands that the IWCP package for any project is a dynamic document, and that updates to the package will occur through the execution phase of a project. The IWCP package warrants constant attention to ensure the quality and incorporation of Engineering Changes, Field Change Orders, and Scope Changes. Quality control of the IWCP package, contract documents, and other project documents are a high priority for all Kaiser-Hill projects. Kaiser-Hill is working to incorporate a system to manage and better maintain the integrity of all project documents to ensure compliance.

If you have any questions, please contact my office.

sak

cc:
Larry Maghrak

United States Government Department of Energy

memorandum

Rocky Flats Field Office

DATE: MAY 1 3 1998

REPLY TO ATTN OF: AMEC:ECD:MOE:03365

SUBJECT: Approval to Proceed with Building 123 Demolition

TO: Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L. L. C

Your request 'Letter, 98-RF-02467, dtd 5/8/98, subject as above' to commence Building 123 Demolition is approved for the north and west wings. The Rocky Flats Field Office Environmental Readiness Evaluation (ERE) team will continue to monitor the project to ensure that start-up is smooth and that the post-start-up findings are closed.

Keith A. Klein
Deputy Manager for Technical Programs

cc:
E. Kray, CDPHE
R. Warther, DNFSB
T. Weadock, EH-24, HQ
J. Legare, AMEC, RFFO
M. Weis, AMPA, RFFO
D. Lowe, AME, RFFO
B. Fitch, ER/WM, RFFO

CORRES. CONTROL
OUTGOING LTR. NO.
DOE ORDER #,

98-RF 02710

DIST.	LTR	ENC
BENSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BURDGE, LARRY		
CARD, BOB		
HARDING, WYNN		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TUOR, NANCY		
VOORHEIS, GARY		
Crowe, Steve	X	
Bruse, Jill	X	
Buhl, Tony		
Daniels, Kevin		
Davis, Bob		
Gillen, Bill		
Kautter, Bob		
Leonard, Eric		
Miles, Paul		
Miller, John		
Schmalz, Greg		
Steelman, Mark		
Walker-Lembke, S.		
Hedahl, Tim		
Rodgers, Alan		
Mathis, Brian		
CORRES.CONTROL	X	X
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:
Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
:rwa

RF-46469 (Rev. 1/98)

KAISER•HILL
COMPANY

May 21, 1998

98-RF-02710

Steve E. Tower
Director Environmental Compliance Division
DOE, RFFO

DOE POST-START FINDINGS FOR BUILDING 123 DECOMMISSIONING PROJECT CLOSED - SKC-046-98

Kaiser-Hill oversight team has reviewed the Building 123 Decommissioning Project responses to the DOE Post-Start Findings. We have found the responses to the post-start findings to be satisfactory. We would appreciate your review and concurrence that the responses adequately close out the post-start findings. The Environmental Readiness Evaluation conducted on this project will be incorporated into the Kaiser-Hill's Lessons Learned section of the Final Closeout Report.

If you desire further information, please contact me at extension 7548 or digital pager 212-1971, or you can contact Jill Bruse at extension 4807 or digital pager 212-3377.

Steven K. Crowe
Division Manager
Closure Projects Engineering and Integration

SJB:rwa

Orig. and 1 cc - S. Tower

Kaiser-Hill Company, L.L.C.
Courier Address: Rocky Flats Environmental Technology
Mailing Address: P.O. Box 464, Golden, Colorado 80402

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 01

To DORTHEA HOYT	From JILL BRUSE
Co.	Co.
Dept.	Phone # 4807
Fax # 8244	Fax # 5037

Attachment 6

Property Disposal Inventory, Economic Disposition Plan, and Documentation of Proper Storage and Handling

This attachment includes the following:

1. Property Disposal Inventory/Economic Disposition Plan*

2. Documentation of Proper Storage

3. Documentation of Completion of the Waste Chemical Actions

*The Property Disposal Inventory and the Economic Disposition Plan are the same document. Economic disposition is noted directly for each item inventoried.

*The Property Disposal Inventory/Economic Disposition Plan included in this Attachment is general. Additional disposal information has been generated and is of considerable size and is on file with K-H SSSOI Department.

ECONOMIC DISPOSAL , L.\N WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0000890500	HOOD	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000890900	PROCESS DRAIN/HOOD	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000891700	PROCESS DRAIN/PERCULORIC FUM	S	N/A	N/A	N/A	37.41	0.00	0.00	150	PSH
0000892800	LEKTRIEVER	4	SPERRYRAND	N/A	N/A	37.41	1,080.00	249.40	125	IA
0000899100	FLOW MEASUREMENT	7	FISHER PORTER	N/A.	N/A	37.41	0.00	2.91	150	DSV
0000899200	FLOW MEASUREMENT	7	FISHER PORTER	N/A	N/A	37.41	0.00	2.91	150	DSV
0000904800	STERILIZER & CLOSE DOOR	5	MARKET FORGE	N/A	N/A	37.41	0.00	2.91	215	PSH
0000905300	CENTRIFUGE	6	N/A	N/A	N/A	74.82	0.00	4.16	600	DSV
0000916800	OVEN	5	SYBRON	N/A	N/A	56.12	0.00	4.16	125	DSV
0000920300	SPECTROPHOTOMETER	4	BAUSH LOMB	N/A	N/A	37.41	0.00	2.92	125	IA
0000929300	SPECTROPHOTOMETER	4	SMITH-HIEFTJE	N/A	N/A	37.41	0.00	2.92	125	IA
0000942100	FURNACE	4	N/A	N/A	N/A	56.12	0.00	4.99	150	DSV
0000945200	PRINTER	4	N/A	N/A	N/A	37.41	0.00	2.91	225	IA
0000952300	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000952400	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000952500	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000952600	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000952700	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000952800	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000953300	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0000961100	OVEN LABORATORY FORCED AIR	5	DESPATCH	N/A	N/A	56.12	0.00	4.99	150	DSV
0000964000	SPECTROPHOTOMETER ATOMIC ABS	4	PERKIN ELMER	N/A	N/A	37.41	0.00	2.91	225	IA
0000966000	SYSTEM GRADIENT SINGE PUMP MO	7	N/A	N/A	N/A	37.41	0.00	2.91	125	IA
0000969300	PROCESSOR WATER INTELLIGENT S	7	N/A	N/A	N/A	37.41	0.00	4.16	200	IA
0000970000	WALKIN UNIMAX CUSTOM BUILT 40	S	N/A	N/A	N/A	37.41	0.00	0.00	0	S
0000972400	LIQUID SCINTILATION COUNTER	4	HP	N/A	N/A	37.41	0.00	2.19	125	IA
0000997300	EXPLOSION PROOF FRIDGE	5	N/A	N/A	N/A	74.82	35.00	4.16	0	S
0001000100	CHAMBER	6	N/A	N/A	N/A	74.82		4.16	125	IA
0001002400	COUNTER SCINTILLATION PACK 2250	4	N/A	N/A	N/A	37.41	0.00	2.19	125	IA
0001022100	CHAMBER	4	N/A	N/A	N/A	74.82	0.00	0.00	250	IA
0001839900	HOOD FUME	S	N/A	N/A	N/A	37.41	0.00	0.00	200	PSH
0001859600	FILE SYSTEM	4	SPERRYRAND	N/A	N/A	74.82	1,080.00	249.40	125	IA

APPROVALS: CChWe... [signatures]

9/10/97

ECONOMIC DISPOSAL WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0002082300	RECORDER XY	4	N/A	N/A	N/A	37.41		4.16	75	DSV
0003862700	SCALER-TIMER RIDL	5	RIDL	N/A	N/A	37.41		4.16	50	DSV
0004013500	COMPUTER	4	IBM	N/A	N/A	37.41		4.16	100	IA
0004545700	PRINTER	4	NEC	N/A	N/A	37.41		4.16	200	PSH
0004545800	AUTO SAMPLER MICROPROCESSOR	4	N/A	N/A	N/A	56.12		4.16	200	DSV
0004654200	INTERFACE UNIT	7	N/A	N/A	N/A	37.41		2.91	100	PSH
0004894300	PLOTTER	4	HP	N/A	N/A	37.41		2.91	100	RSS
0005333400	HARD DRIVE	4	MAC 2CI	N/A	N/A	37.41		2.91	100	RSS
0005376500	MONITOR	4	DIGITAL	N/A	N/A	37.41		2.91	40	PSH
0005513000	COMPUTER	4	DIGITAL	N/A	N/A	37.41		2.91	150	RSS
0006390900	COMPUTER	4	MACINTOSH	N/A	N/A	37.41		2.91	225	IA
0007865800	PH METER	4	HACH	N/A	911100779	37.81		2.91	50	DSV
0007935300	SYSTEM ALPHA-PHA COUNTING	7	N/A	N/A	N/A	56.12		4.16	325	IA
0008070900	MONITOR	4	N/A	N/A	N/A	37.41		2.91	50	RSS
0008459700	DIGITAL ETHERNET INTERCONNECT	4	DIGITAL	N/A	N/A	18.71		2.91	15	RSS
0009020900	COMPUTER	4	N/A	N/A	N/A	37.41		4.16	150	RSS
0009633900	PUMP TURBO	4	DANIELSON	N/A	N/A	56.12	70.00	4.99	125	DSV
0009634000	PUMP TURBO	4	DANIELSON	N/A	N/A	56.12	70.00	4.99	125	DSV
0009652300	MEDIA SCAN	4	TUIN	N/A	N/A	37.41		2.91	50	DSV
0009652400	HARD DRIVE	4	AUSTIN	N/A	N/A	37.41		2.91	100	RSS
0009652500	KEYBOARD	4	N/A	N/A	N/A	37.41		2.91	15	RSS
0009659300	FURNACE	5	THERMOLINE	N/A	N/A	56.12		4.16	325	IA
0009659600	COOLANT CIRCULATOR	4	INSTRUM. LAB	N/A	N/A	37.41		4.16	100	DSV
0009660000	BACTERIA COLONY COUNTER	4	REICHERT JUNG	N/A	N/A	37.41		2.91	60	DSV
0009660100	INCUBATOR	4	NATIONAL	N/A	N/A	37.41		2.91	85	DSV
0009660200	INCUBATOR	4	PRECISION SCI	N/A	N/A	37.41		2.91	85	DSV
0009663000	BALANCE SARTORIUS	4	N/A	N/A	N/A	56.12		2.91	120	DSV
0009674600	AUTOCLAVE BENCHTOP	5	N/A	N/A	N/A	56.12		2.91	300	DSV
000989800	DISPLAY	7	N/A	N/A	N/A	37.41		2.91	60	RSS
0012429400	PUMP TURBO	4	DANIELSON	N/A	N/A	56.12	70.00	4.99	300	PSH
12302822341	TYPEWRITER	7	N/A	N/A	N/A	37.41		4.16	25	RSS
12337490022	SPECTROMETER	7	N/A	N/A	N/A	37.41		4.16	100	PSH

APPROVALS:

9/10/97

ECONOMIC DISPOSAL PLAN WORKSHEET FOR BLDG. 123

	ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
	238463853	LAB COUNTERS	6	N/A	N/A	N/A	74.82		4.16	75	DSV
	D4112521456	LAB COUNTERS	6	N/A	N/A	N/A	74.82		4.16	75	DSV
1	0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	37.41		24.94	350	PSH
2	0617125005	SHELF, DESK	6	N/A	N/A	N/A	74.82		35.00	30	RSS
3	0614460004	AIR CONDITIONER (ALL MAKES)	4	CARRIER/INT'L	N/A	N/A	56.12		4.99	65	PSH
4	0617110002	OFFICE FURNITURE	4	N/A	N/A	N/A	74.82		35.00	100	RSS
5	0617125004	SHELF, WOOD	5	N/A	N/A	N/A	37.41		35.00	30	RSS
6	0614460004	AIR CONDITIONER (ALL MAKES)	5	N/A	N/A	N/A	56.12		0.00	65	PSH
7	0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82		35.00	65	RSS
8	0617125001	CABINETS, SHELVING, LOCKERS	4	N/A	N/A	N/A	74.82		35.00	40	RSS
9	0617125003	CABINET, FILE	6	N/A	N/A	N/A	74.82		2.91	35	RSS
	0617210000	MISCELLANEOUS OFFICE SUPPLIES	4	N/A	N/A	N/A	74.82		4.99	100	RSS
	0617110002	OFFICE FURNITURE	6	N/A	N/A	N/A	74.82		4.16	19	RSS
	0617110006	OFFICE, WALL BOARD (ALL TYPES)	5	N/A	N/A	N/A	37.41	35.00	12.71	20	RSS
	0617125001	CABINETS SHELVING LOCKERS	5	N/A	N/A	N/A	74.82	35.00	12.71	35	RSS
	0617125003	FILE CABINET	5	N/A	N/A	N/A	74.82		2.91	35	RSS
	0617490003	MISCELLANEOUS OFFICE SUPPLIES	4	N/A	N/A	N/A	74.82		4.99	100	RSS
	0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82	35.00	12.71	40	RSS
	0618415006	WATER SAFETY EYEWASH STATION	4	N/A	120000	401656	37.41	35.00	2.91	10	RSS
	0616640003	LAB TABLE, BENCH	S	N/A	N/A	N/A	74.82			0	S
	0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82	35.00	4.99	50	RSS
	0617125001	CABINETS, SHELVING	S	N/A	N/A	N/A	74.82			0	S
	0618415006	WATER SAFETY EYEWASH STATION	4	N/A	N/A	N/A	37.41	35.00	2.91	10	RSS
	0616640001	LAB EQUIP AND SUPPLIES	S	N/A	N/A	N/A	112.23			0	S
	0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82	35.00	4.99	75	RSS
	0618105001	BAG SEALER	6	N/A	N/A	N/A	37.41		2.91	15	RSS
	0618415006	WATER SAFETY EYEWASH STATION	8	N/A	N/A	N/A	37.41	35.00	2.91	10	RSS
	0617025012	COMPUTER MISCELLANEOUS	4	N/A	N/A	N/A	37.41		4.99	15	RSS
	0617110002	OFFICE FURNITURE	7	N/A	N/A	N/A	74.82	35.00	12.71	60	RSS
	0617125001	CABINETS, SHELVING, LOCKERS	S	N/A	N/A	N/A	74.82			0	S
	0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82	35.00	12.71	60	RSS
	0617125001	CABINETS, SHELVING, LOCKERS	5	N/A	N/A	N/A	74.82	35.00	12.72	35	RSS

APPROVALS: C Chee... [signatures]

9/10/97

ECONOMIC DISPOSAL PLAN WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0617125003	CABINET, FILE	5	N/A	N/A	N/A	74.82		4.16	35	RSS
0614460004	AIR CONDITIONER (ALL MAKES)	6	TRANE	N/A	N/A	56.11		4.16	60	RSS
0617110002	OFFICE FURNITURE	4	N/A	N/A	N/A	74.82		8.32	65	RSS
0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	37.41		12.48	200	PSH
0617110006	OFFICE, WALL BOARD (ALL TYPES)	4	N/A	N/A	N/A	37.41		4.16	17	RSS
0617125005	SHELF, DESK	4	N/A	N/A	N/A	74.82		4.16	30	RSS
0617310000	FOOD SERVICE EQUIPMENT	5	N/A	N/A	N/A	37.41		4.16	25	RSS
0617310001	GARBAGE PAIL, FOOD	5	N/A	N/A	N/A	37.41		4.16	5	RSS
0617310002	COFFEE MAKER, FOOD	4	ROBESON	N/A	N/A	37.41		4.16	25	RSS
0614320000	POWER AND HAND PUMPS, NOT LAB	5	N/A	N/A	N/A	37.41		4.16	20	RSS
0614710001	PIPE NIPPLES AND VALVES	S	N/A	N/A	N/A	37.41				
0616240000	ELECTRIC LAMPS	4	BLAKRAY	UVL-56	N/A	37.41		4.16	5	RSS
0616530002	INCUBATOR, MEDICAL	4	GALLENKAMP	N/A	N/A	37.41		4.16	100	DSV
0616530003	TITRATOR, MEDICAL	5	FISHER PORTER	N/A	N/A	37.41		4.16	100	DSV
0616530004	MICROSCOPE, MEDICAL	5	BAUSCH LOMB	N/A	N/A	37.41		4.16	125	DSV
0616665003	METER, PH	4	CORNING	N/A	N/A	37.41		4.16	20	PSH
0617110002	OFFICE FURN	5	N/A	N/A	N/A	74.82		4.16	150	PSH
0617125003	CABINET, FILE (ALL TYPES)	4	N/A	N/A	N/A	74.82		12.48	35	RSS
0617520000	KEYBOARD, OFFICE	5	N/A	N/A	N/A	37.41		2.08	15	RSS
0613415002	CRUSHING STONES, GRINDING	S	N/A	N/A	N/A	37.41			0	S
0614430001	FURNACE CART	S	N/A	N/A	N/A	37.41			0	S
0616664003	LAB TABLE/BENCH	6	N/A	N/A	N/A	74.82		8.32	160	RSS
0617110002	OFFICE FURNITURE	6	N/A	N/A	N/A	74.82		4.16	100	RSS
0617125001	CABINETS, SHELVING	4	N/A	N/A	N/A	74.82		8.32	45	RSS
0617310000	OVEN, MICROWAVE	6	N/A	N/A	N/A	37.41		4.16	75	PSH
0617420000	CALCULATING MACHINES	5	TEXAS INSTRUM	N/A	N/A	37.41		2.08	30	RSS
0618415006	WATER SAFETY EYEWASH STATION	4	N/A	900	880105	37.41		4.16	10	RSS
0614460004	AIR CONDITIONER (ALL MAKES)	4	N/A	N/A	N/A	56.11		8.32	60	PSH
0617110001	OFFICE CHAIRS, METAL, ON CASTERS	4	N/A	N/A	N/A	37.41		8.32	19	RSS
0617110002	OFFICE FURNITURE	4	N/A	N/A	N/A	74.82		8.32	30	RSS
0617125001	CABINETS, SHELVING, LOCKERS	5	N/A	N/A	N/A	74.82		8.32	40	RSS
0617490003	MISCELLANEOUS OFFICE SUPPLIES	4	N/A	N/A	N/A	74.82		8.32	75	RSS

APPROVALS: CWeil K [illegible]

9/10/97

ECONOMIC DISPOSAL PLAN WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0617510001	OFFICE SUPPLIES	4	N/A	N/A	N/A	0		8.32	50	RSS
0617520003	OFFICE DEVICES (STAPLERS, ETC.)	4	N/A	N/A	N/A	0		4.16	12	RSS
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	74.82		8.32	65	RSS
0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	32.41		16.64	100	PSH
0617125003	CABINET, FILE	4	N/A	N/A	N/A	32.41		8.32	35	RSS
0617490003	MISCELLANEOUS OFFICE SUPPLIES	4	N/A	N/A	N/A	0		4.16	25	RSS
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	32.41		8.32	45	RSS
0617125003	CABINET, FILE	5	N/A	N/A	N/A	32.41		4.16	35	RSS
0617310003	MICROWAVE OVEN, FOOD	5	N/A	N/A	N/A	32.41		4.16	75	PSH
0613431010	ELECTROPLATING SYSTEMS	6	N/A	N/A	N/A	32.41			50	DSV
0616640001	LAB EQUIP AND SUPPLIES	S	N/A	N/A	N/A	74.82			0	S
0617110003	OFFICE DESKS, WOODEN	4	N/A	N/A	N/A	0		4.16	60	RSS
0618415006	WATER SAFETY EYEWASH STATION	5	N/A	N/A	N/A	56.11		4.16	10	PSH
0616640001	LAB EQUIP AND SUPPLIES	S	FISHER SCIENTIFI	N/A	N/A	74.82			0	S
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	0		8.32	50	RSS
0617125001	CABINETS, SHELVING, LOCKERS	4	N/A	N/A	N/A	74.82		8.32	100	RSS
0617430001	TYPEWRITER STAND/CART	5	N/A	N/A	N/A	0		4.16	15	RSS
0618415006	WATER SAFETY EYEWASH STATION	4	N/A	N/A	N/A	56.11		4.16	10	PSH
0617025012	COMPUTER MISCELLANEOUS	6	N/A	N/A	N/A	37.41		8.32	40	RSS
0617025025	COMPUTER GRAPHICS	4	N/A	N/A	N/A	37.41		4.16	10	PSH
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	0		4.16	60	RSS
0617125001	CABINETS, SHELVING, LOCKERS	4	N/A	N/A	N/A	74.82		8.32	60	RSS
0617125003	CABINET, FILE	4	N/A	N/A	N/A	0		4.16	35	RSS
0617430000	TYPEWRITERS, OFFICE TYPE	4	N/A	N/A	N/A			4.16	42	RSS
0615355001	TABLE/MARBLE BALANCE	4	N/A	N/A	N/A	112.23		4.16	125	RSS
0615850003	DIGITAL READER/GRAPH	4	N/A	N/A	N/A	37.41		4.16	35	RSS
0616630002	CHEM ANALYSIS INSTRUMENTS	4	N/A	N/A	N/A	37.41		4.16	20	RSS
0616630005	ELECTRICAL, VOLT METER	6	N/A	N/A	N/A	37.41		4.16	15	RSS
0616640003	LAB TABLE/BENCH	S	N/A	N/A	N/A	74.82		8.32	0	S
0616640004	LAB CONTROLLER	4	N/A	N/A	N/A	37.41		4.16	15	RSS
0616665002	SPECTROMETER	4	N/A	N/A	N/A	37.41			25	PSH
0617110002	OFFICE FURNITURE	S	N/A	N/A	N/A	0		8.32	0	S

APPROVALS: C C Ward K [illegible]

9/10/97

ECONOMIC DISPOSAL PLAN WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0617125001	CABINETS, SHELVING, LOCKERS	4	N/A	N/A	N/A	74.82		4.16	30	RSS
0617110002	OFFICE FURNITURE	6	N/A	N/A	N/A	0		4.16	45	RSS
0617110006	OFFICE, WALL BOARD (ALL TYPES)	4	N/A	N/A	N/A	0		8.32	17	RSS
0617125003	CABINET, FILE	5	N/A	N/A	N/A	0		4.16	40	RSS
0617310000	OVEN, MICROWAVE	7	N/A	N/A	N/A	37.41		4.16	55	RSS
0617310000	FOOD SERVICE EQUIP.	7	N/A	N/A	N/A	37.41		4.16	30	RSS
0614610004	HEATER, SPACE, (ALL MAKES)	4	RIVAL	N/A	N/A	37.41		4.16	25	RSS
0617025012	COMPUTER, MISC	4	N/A	N/A	N/A	37.41		4.16	15	RSS
0617110002	OFFICE FURNITURE	4	N/A	N/A	N/A	37.41		8.32	60	RSS
0617110006	OFFICE, WALL BOARD (ALL TYPES)	4	N/A	N/A	N/A	37.41		8.32	17	RSS
0617125001	CABINETS, SHELVING, LOCKERS	5	N/A	N/A	N/A	37.41		8.32	40	RSS
0617125003	CABINET, FILE	5	N/A	N/A	N/A	0		4.16	45	RSS
0617490003	MISCELLANEOUS OFFICE SUPPLIES	5	N/A	N/A	N/A	0		4.16	100	RSS
0615340001	MISC HARDWARE	5	N/A	N/A	N/A	37.41		4.16	85	PSH
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	0		4.16	25	RSS
0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	0		4.16	100	PSH
0617125001	CABINETS, SHELVING, LOCKERS	5	N/A	N/A	N/A	37.41		8.32	65	RSS
0617125003	CABINET, FILE	6	N/A	N/A	N/A	37.41		4.16	45	RSS
0617240000	UTILITY CONTAINERS	5	N/A	N/A	N/A	37.41		4.16	15	RSS
0617110002	OFFICE FURNITURE	6	N/A	N/A	N/A	37.41		4.16	40	RSS
0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	37.41		4.16	60	PSH
0617125001	CABINETS, SHELVING, LOCKERS	4	N/A	N/A	N/A	37.41		8.32	40	RSS
0613431004	WELDER, VACUUM PUMP, WIRE FEED	5	N/A	N/A	N/A	37.41		8.32	80	RSS
0614320000	POWER AND HAND PUMPS NOT LAB	4	PACO	N/A	N/A	37.41		4.16	40	RSS
0614460002	FAN, ROTRON	4	N/A	N/A	N/A	37.41		4.16	20	PSH
0614460002	FAN, GALVANIZED ADAPTERS	4	N/A	N/A	N/A	37.41		4.16	20	PSH
0614460004	AIR CONDITIONER (ALL MAKES)	4	N/A	N/A	N/A	56.11		4.16	60	PSH
0614310004	HEATER, SPACE, (ALL MAKES)	5	N/A	N/A	N/A	37.41		4.16	25	RSS
0614910001	MAINTENANCE LADDERS, ALL SIZES	5	N/A	N/A	N/A	74.82		4.16	25	PSH
0615950000	COILS AND TRANSFORMERS	5	SIEMENS ALLIS	N/A	N/A	37.41		8.32	40	PSH
0616105002	ELECT MOTOR CIRCUIT PROTECT	1	N/A	N/A	N/A	37.41		8.32	75	RSS
0616105003	ELECTRIC MOTOR CONTROL CENTER	5	RELIANCE ELEC	N/A	N/A	37.41		8.32	25	PSH

APPROVALS: C C Ward K A [illegible]

9/10/97

ECONOMIC DISPOSAL PLAN WORKSHEET FOR BLDG. 123

ITEM#	NOMENCLATURE	CC	MAKE	MODEL	SERIAL#	RAD COST	SKILLED LABOR COST	PACKING REMOVAL COST	FMV	FMV CODE
0616120000	ELECTRIC, TRANSFORMERS	5	N/A	N/A	N/A	37.41		8.32	60	DSV
0616350001	ALARM SIGNAL SECURITY BELLS	S	HONEYWELL	N/A	N/A	37.41		4.16	0	S
0617025011	COMPUTER, PRINTER	S	N/A	N/A	N/A	37.41		4.16	0	S
0617110002	OFFICE FURNITURE	S	N/A	N/A	N/A	0		8.32	0	S
0614460004	AIR CONDITIONER (ALL MAKES)	4	N/A	N/A	N/A	56.11		8.32	60	PSH
0617110005	OFFICE WALL AND DIVIDERS	4	N/A	N/A	N/A	0		8.32	50	PSH
0617125001	CABINETS, SHELVING, LOCKERS	6	N/A	N/A	N/A	74.82		8.32	60	RSS
0617125003	CABINET, FILE	5	N/A	N/A	N/A	74.82		8.32	45	RSS
0617430001	TYPEWRITER, STAND, CART	4	N/A	N/A	N/A	37.41		4.16	15	RSS
0614460004	AIR CONDITIONER (ALL MAKES)	5	COMFORT AIRE	N/A	N/A	56.11		8.32	60	PSH
0616210002	LIGHTING, EMERGENCY	4	N/A	N/A	N/A	32.41		4.16	15	PSH
0616530005	RADIOLOGICAL SUPPLIES, MEDICAL	2	N/A	N/A	N/A	74.82		4.16	40	DSV
0616695004	AIR SAMPLER, HV, MOTOR	4	N/A	N/A	N/A	37.41		4.16	40	DSV
0617110002	OFFICE FURNITURE	S	N/A	N/A	N/A	0		4.16	0	S
0617110006	OFFICE, WALL BOARD (ALL TYPES)	4	N/A	N/A	N/A	0		4.16	17	RSS
0617125003	CABINET, FILE	6	N/A	N/A	N/A	0		4.16	45	RSS
0617240001	UTILITY CART, JANITOR CART	4	N/A	N/A	N/A	32.41		4.16	15	RSS
0617240002	BUFFER PADS, UTILITY	2	N/A	N/A	N/A	32.41		2.08	10	RSS
0617490003	MISCELLANEOUS OFFICE SUPPLIES	6	N/A	N/A	N/A	0		4.16	60	RSS
0614320000	POWER AND HAND PUMPS	4	UNIMOUNT	125	N/A	32.41		4.16	20	RSS
0614460004	AIR CONDITIONER (ALL MAKES)	5	N/A	N/A	N/A	56.11		4.16	60	PSH
0614910001	MAINTENANCE LADDERS, ALL SIZES	4	N/A	N/A	N/A	74.82		4.16	25	PSH
0615975003	ELECTRICAL PANEL ALL MFRS	4	N/A	N/A	N/A	74.82		4.16	50	PSH
0617110002	OFFICE FURNITURE	5	N/A	N/A	N/A	0		4.16	60	RSS
0617240001	UTILITY CART, JANITOR CART	5	N/A	N/A	N/A	32.41		2.08	15	RSS
0617110002	OFFICE FURNITURE	8	N/A	N/A	N/A	0		4.16	60	RSS
0617110006	OFFICE, WALL BOARD (ALL TYPES)	4	N/A	N/A	N/A	0		4.16	17	RSS

APPROVALS: [signature]

9/10/97

DynCorp of Colorado, Inc.

Interoffice Memorandum

DATE	February 28, 1998
TO	Grover Snipes, Property Management Director, Bldg. 061, X9834
FROM	Grover Snipes, Property Management Director, Bldg. 061, X9834
SUBJECT	MEMO FOR THE RECORD-GES-029-98

On February 27, 1998, Rick Perry, Kaiser-Hill and Grover Snipes, DCI, conducted a physical walk-down and confirmed that the few remaining items from building 123 that have not been disposed of are stored properly.

GES:ds

cc:
Rick Perry

DynCorp of Colorado, Inc.

Interoffice Memorandum

DATE February 28, 1998

TO Grover Snipes, Property Management Director, Bldg. 061, X9834

FROM Grover Snipes, Property Management Director, Bldg. 061, X9834

SUBJECT MEMO FOR THE RECORD-GES-029-98

On February 27, 1998, Rick Perry, Kaiser-Hill and Grover Snipes, DCI, conducted a physical walk-down and confirmed that the few remaining items from building 123 that have not been disposed of are stored properly.

GES:ds

cc:
Rick Perry

:ORRES. CONTROL
LTR. NO.
iginator Ltr Log #
GRK-316-97
- RF -

DIST.	LTR	ENC
NSON, C.A.		
RMEAN, C.H.		
AWFORD, A.C.		
WSON, D.		
WARDS, J.D.		
DLEY, M.E.		
Z, R.C.		
INN, L.A.		
GHES, F.P.	X	
ERUD, T.W.		
ICE, K.D.		
SON, A.M.		
GNER, M.J.		
EELER, M.		
Bentsen	X	
Heitland	X	
Moynihan		
RS RECORDS	X	X
CORRES. CONTROL		
TRAFFIC		
TS/T130G		

CLASSIFICATION:
UCNI
UNCLASSIFIED
CONFIDENTIAL
SECRET

AUTHORIZED CLASSIFIER SIGNATURE:

Date:

REPLY TO RF CC NO.:

ACTION ITEM STATUS:
PARTIAL/OPEN
CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS

46469(Rev. 1/97)

RMRS Rocky Mountain Remediation Services, L.L.C

. . . protecting the environment

Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, Colorado 80402-0464
Phone:(303) 966-5358
Fax: (303) 966-4641

October 30, 1997

Karan North
Environmental Program Manager
Building T130C
Kaiser-Hill, L.L.C

WASTE CHEMICAL PROGRAM: B123 FACILITY GROUP - GRK-316-97

Ref: Mike Jennings MJJ-061-97, WASTE CHEMICAL PROGRAM COMPLETION OF CONSENT ORDER WASTE CHEMICAL REMOVAL ACTIONS, October 22, 1997

As Environmental Manager for RMRS, I have read the Waste Chemical Project Plan and the governing Compliance Order on Consent.

Additionally, I am in receipt of Kaiser-Hill's correspondence dated October 22, 1997 informing RMRS that the Waste Chemical Program (the "Program") personnel have completed their waste chemical removal actions in the B123 Facility Group. I have advised Ron Heitland (Decommissioning Manager) and Ernie Bentsen (Environmental Coordinator) that, from the date of this correspondence, all non-excluded waste chemicals located in this Facility must be managed in accordance with RCRA requirements. Failure to do so may result in regulatory entities assessing fines or penalties against the owner or manager of the waste chemicals.

RMRS owns no Excluded Chemicals in the B123 Facility Group. In the event that Excluded Chemicals would be found, I understand that additions to the list of Excluded Chemicals must be approved by both Kaiser-Hill's Waste Chemical Program Manager and the Colorado Department of Public Health and Environment's Program Manager. Any Excluded Chemicals in the B123 Facility Group will be managed in accordance with the inspection requirements set forth in the Compliance Order on Consent as well as the provisions of the Waste Chemical Project Plan.

Sincerely,

Gary R. Konwinski

Gary Konwinski
Environmental Manager

cc:
Mike Jennings
Karen Lavorato
Alan Parker

Best Available Copy

Attachment 7

Reconnaissance Level Characterization Report

Attachment 7
RF/RMRS-98-253.UN

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-021

INFORMATION ONLY

Reconnaissance Level Characterization Report For Building 123

Rocky Mountain Remediation Services, L. L. C.

October 1997

RECONNAISSANCE LEVEL CHARACTERIZATION REPORT

TABLE OF CONTENTS

TABLE OF CONTENTS ... i

ACRONYMS ... iv

1.0 INTRODUCTION ... 1

1.1 PURPOSE ... 1

1.2 SCOPE ... 1

1.3 METHODOLOGY ... 1

1.4 SUMMARY ... 2

1.5 CONCLUSIONS ... 2

1.5.1 Radiological Surveys ... 3
1.5.2 Hazardous Chemicals Evaluation ... 3
1.5.3 Asbestos Inspections ... 3
1.5.4 Lead Paint Inspection and Sampling ... 7
1.5.5 Beryllium Sampling ... 7
1.5.6 PCB Evaluation ... 7

2.0 BUILDING 123 PHYSICAL DESCRIPTION ... 7

2.1 SUMMARY DESCRIPTION OF THE BUILDING 123 CLUSTER ... 7

2.2 SPECIFIC DESCRIPTION OF THE BUILDING 123 CLUSTER ... 10

2.2.1 Foundations ... 10
2.2.2 Structural Framing ... 10
2.2.3 Exterior Walls ... 10
2.2.4 Floors ... 10
2.2.5 Roofs ... 11
2.2.6 Interior Walls ... 11
2.2.7 Ceilings ... 11
2.2.8 Doors ... 11
2.2.9 Windows ... 11
2.2.10 Surface Finishes ... 11

3.0 GENERAL OPERATING HISTORY ... 11

3.1 Operating History of Buildings 123, 113, 114, and 123S ... 11

3.1.1 Building 123 ... 11
3.1.2 Building 113 ... 12
3.1.3 Building 114 ... 12
3.1.4 Building 123S ... 13

3.2 RCRA and Comprehensive Environmental Response and Liability Act (CERCLA) Designated Areas ... 13

3.2.1 RCRA Unit 40 13
3.2.2 IHSS 121 13
3.2.3 IHSS 148 14

3.3 IDENTIFIED BUILDING HAZARDS 15

3.3.1 Asbestos 15
3.3.2 Beryllium 16
3.3.3 Chemicals 16
3.3.4 RCRA Hazardous Waste in SAAs 16
3.3.5 Perchloric Acid 16
3.3.6 Pressurized Gas Cylinders and Liquid Nitrogen 16
3.3.7 Polychlorinated Biphenyls (PCBs) 17
3.3.8 Radiological Contaminated Materials 17
3.3.9 Metals 17

3.4 DESCRIPTION OF OPERATIONS 21

3.4.1 Room 158 Receiving Station 21
3.4.2 Room 157 Sample Preparation Laboratory 21
3.4.3 Room 156 Sample Preparation Laboratory 21
3.4.4 Room 163 Air Filter Counting Laboratory 22
3.4.5 Room 155A TLD Irradiator Room 22
3.4.6 Room 103A Special Bioassay Laboratory 22
3.4.7 Room 105 Chemistry Development Laboratory 22
3.4.8 Room 112 Special Environmental Laboratory 22
3.4.9 Room 123 Calibration Sources 22
3.4.10 Rooms 124 and 127 22
3.4.11 Room 125 Bioassay Laboratory 22
3.4.12 Room 126 Gas Chromatography 23
3.4.13 Room 135 Alpha Spectroscopy and Liquid Scintillation Counting 23
3.4.14 Room 149 Gamma Spectroscopy 23

4.0 RADIOACTIVE AND HAZARDOUS CHARACTERISTICS 23

4.1 FACILITY WORK AREAS 24

4.2 FACILITY CHARACTERIZATION 24

4.3 QUALITY ASSURANCE PROGRAM 24

4.3.1 Waste Management 25
4.3.2 Health and Safety/Industrial Hygiene 25

5.0 INFORMATION SOURCES 25

5.1 FACILITY RECORDS 25

5.2 FACILITIES ENGINEERING RECORDS 25

5.3 FIRST-HAND PROCESS KNOWLEDGE INFORMATION 25

6.0 REFERENCES 26

APPENDICES

Appendix A—Building 123 Characterization A-1

FIGURES

2-1 Building 123 Area Location 8
2-2 Building 123 Area Map 9

TABLES

1-1 Summary of Building 123 Characterization 4
3-3 Radiological Survey Summary 18

ACRONYMS

ACM	Asbestos-containing material
ALARA	As Low As Reasonably Achievable
Am	Americium
Ba	Barium
Be	Beryllium
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response and Liability Act
CFR	Code of Federal Regulations
$C_2H_4O_2$	Acetic acid
Cm	Curium
DOE	Department of Energy
dpm	Disintegrations per minute
DPP	Decommissioning Program Plan
ED	External Dosimetry
EDE	Effective Dose Equivalent
FIDLER	Field Instrument for the Detection of Low Energy Radioactivity
H^3	Tritium
HASP	Health and Safety Plan
HCl	Hydrochloric acid
$HCLO_4$	Perchloric acid
HEPA	High-efficiency particulate air
HF	Hydrofluoric acid
HNO_3	Nitric acid
HPGe	High-purity germanium survey
HPI	Health Physics Instrumentation
HRR	Historical Release Report
H_2SO_4	Hydrosulfuric acid
HVAC	Heating, ventilating, and air conditioning
IEP	Idle Equipment Program
IH	Industrial Hygiene
IHSS	Individual Hazardous Substance Site
IPC	In-process characterization
IWCP	Industrial Work Control Plan
LLM	Low-Level Mixed Waste
LLW	Low-Level Waste
mrem	Millirem
MARSSIM	Multi-Agency Radiological Site Survey and Site Investigation Manual
NaOH	Sodium hydroxide
NH_4OH	Ammonium hydroxide
Ni	Nickel
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAM	Proposed Action Memorandum
Pb	Lead
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethane
PEP	Project Execution Plan
PPE	Personal Protective Equipment
Pu	Plutonium

QA/QC	Quality Assurance/Quality Control
R&D	Research and development
RAD	Radiological
RCA	Radiologically Contaminated Area
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RLCR	Reconnaissance Level Characterization Report
RMMA	Radioactive Material Management Area
RMRS	Rocky Mountain Remediation Services
RPT	Radiological Protection Technologists
RWP	Radiation Work Permit
RMRS	Rocky Mountain Remediation Services
SAA	Satellite Accumulation Area
SAP	Sampling and Analysis Plan
Sr	Strontium
TBC	To-be-considered
TFCM	Tichlorofluoromethane
TICI3	Titanium chloride
TLD	Thermoluminescent dosimeter
TSCA	Toxic Substances Control Act
TSD	Treatment storage disposal
U	Uranium
VOC	Volatile organic compounds
VSP	Vertical soil profile
WSRIC	Waste Stream Residue Identification Characterization

RECONNAISSANCE LEVEL CHARACTERIZATION REPORT

1.0 INTRODUCTION

Due to the change in mission of the Rocky Flats Environmental Technology Site (RFETS) from the production of nuclear components to environmental cleanup and shutdown, Building 123 and its associated facilities have no identified mission after Fiscal Year 1997. Accordingly, Building 123 is being decommissioned to reduce RFETS operating costs and hazards.

1.1 PURPOSE

The purpose of this Reconnaissance Level Characterization Report (RLCR) is to present a summary of the available historical data and process information relating to the Building 123 Cluster. Characterization includes identification of the type, quantity, condition, and location of both confirmed and potential sources of radioactive and hazardous substances within the subject area. The following facility information incorporates Building 123 project files and pertinent data from various sources. The report is to serve as a practical reference during the decontamination and decommissioning efforts.

This project will facilitate the decommissioning of Buildings 123, 113, 114, and 123S; remediation of Individual Hazardous Substance Sites (IHSSs) 121 and 148; partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40; and decontamination of radiologically-contaminated facility systems. The Building 123 slab and foundation will be removed as required to remediate any subsurface contamination as dictated by soil sampling results.

1.2 SCOPE

The information presented in this report supports the task defined in the Proposed Action Memorandum (PAM) for the Department of Energy (DOE) and pertains only to Building 123 and associated facilities. The review of historical records and the collection of process knowledge information details the operational history from original building construction to present.

1.3 METHODOLOGY

The general methodology employed for the preparation of this report involved the identification, location, collection, and review of available Building 123 records. The information sources examined in the course of this effort are listed in Section 5.0.

Collection of process information included interviews with RFETS employees whom had first-hand process knowledge of Building 123 operations. The individuals are identified in the project files.

Comprehensive physical inspections of all accessible areas of Building 123 were conducted during the months of April and May 1997 and will continue as decommissioning progresses. The primary objectives of the inspections are:

- To confirm the accuracy of file documentation pertaining to as-built or modified facility construction equipment installations and general facility conditions. Physical hazards are addressed in the Building 123 project specific Health and Safety Plan (HASP).
- To confirm and improve the accuracy of current facility inventory records of radioactive materials, special nuclear materials, hazardous materials, facility-related equipment, and to obtain volume estimates for wastes which will be generated during decommissioning activities.

- To locate, identify, and document any facility condition or problem situation which had not been previously identified or otherwise documented in building records or files.
- To identify equipment, structures, process lines, and associated items which will require field surveys and/or analytical sampling for the purposes of further characterization of the Building 123 facilities. Sampling activities will be conducted prior to decommissioning efforts. Routine and decommissioning effectiveness surveys as part of an In-Process Characterization (IPC) will be conducted throughout the decommissioning process.
- To support the Building 123 Project Execution Plan (PEP)

A summary of conditions within each area of Building 123 is provided in Appendix A. Appendix A also identifies surveys or sampling required as a part of the IPC effort.

1.4 SUMMARY

A detailed examination of process knowledge and documents, relating to Building 123 was initiated in April 1997. As part of this examination, a comprehensive survey of historical records was undertaken to determine the location and character of any radioactive and hazardous contaminants present in the area. A room by room compilation of relevant process knowledge and characterization information is presented in Section 4.0. The general conclusions drawn from this examination are as follows:

Presently, Building 123 is in a fully operational condition. All required utility services (i.e., electrical service, water supply, and natural gas supply) are active. Building air ventilation and High Efficiency Particulate Air-(HEPA) filtered exhaust systems, instrument air supply compressors, and necessary radiological monitoring instrumentation systems are in normal continuous operation. All manually-actuated and automated fire/alarm suppression systems are operational. All installed facility security and radiological alarm systems are normal. All remote-handling mechanisms and auxiliary facility support equipment are operational or are available for activation and use.

Building 123 presently houses a small inventory of materials and equipment which are radioactive, radioactively-contaminated, and/or contain hazardous substances.

Equipment which was thought to contain hazardous substances were put in the Idle Equipment Program (IEP). This ensured that the equipment fluids would be tested for the presence of hazardous substances. Equipment fluids found to contain a hazardous substance were removed during deactivation. Due to the age of the facility, considerable amounts of asbestos are present in the insulation and building materials. Lead is present in the vault shielding and in some of the building materials.

1.5 CONCLUSIONS

Based on review of the available information, it was determined that limited additional sampling and radiation surveys would need to be conducted prior to completing the project. The following decisions/observations were made from the Reconnaissance Characterization data and additional sampling which was conducted in the April to June 1997 time frame. Table 1-1, "Summary of B123 Characterization" presents a brief overview of the results for each room. Radiological values are presented in Table 3-3 of this document.

1.5.1 Radiological Surveys

Historical reports indicate that there are no areas within Building 123 which have significant amounts of unidentified/uncontrolled/unmarked radioactive contamination. There are some areas which are clearly identified as contamination areas. As equipment is removed from Building 123 facilities, sampling and analysis for fixed radiation contamination will be completed. Current planning is to decontaminate all rooms which handled significant quantities of radioactive material. Preliminary Scoping Surveys of all laboratories and RMMAs/RCAs were conducted during the month of June 1997. Fixed contamination was found in Rooms 105, 106, 109, 123A and 125 as a result of the scoping surveys. Further evaluation of these rooms will be conducted to identify radioactive isotopes that are present.

1.5.2 Hazardous Chemicals Evaluation

Although there were hazardous chemicals used in Building 123 facilities, all excess and hazardous chemicals have been inventoried and are scheduled to be removed from Building 123 facilities during the deactivation process. Should a chemical be found during the decommissioning process, the chemical will be handled in accordance with existing chemical identification and handling procedures. Areas such as the perchloric acid hoods will be smeared with pH paper to identify acid residues which may exist to be decontaminated.

1.5.3 Asbestos Inspections

The specific quantity and distribution of asbestos containing material (ACM) has been estimated based on two(2) current asbestos building inspections which are documented in the following reports:

"Asbestos Inspection and Operations and Maintenance Plan for Building 123", Department of Energy Project No. 108230, December 31, 1996.

Asbestos Characterization Report: Addendum to Building 123 Inspection, SEG,CO Rev. 0 April 29,1997.

Walkdowns conducted in April 1997 revealed that there is asbestos in some insulation material, and potentially in some ceiling tiles, floor tiles, mastic and wall board compound. Much of the insulation material has been wrapped in place to prevent the asbestos from being disturbed. The other areas which have a potential for containing asbestos are in good condition. Further sampling and asbestos abatement will precede any activity which would disturb the potential asbestos containing material.

Table 1-1 Summary Of B123 Characterization

W = Wall Board
T = Tile (Floor)
P = Pipe Insulation

Y = Yes, Detectable
N = Not Detected
NS = Not Suspect

Room Number	Asbestos >1%	Be ug/ft2	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
100 West Entry	W/T/P	NS	Y	N	N	
101 Office	W/T/P	NS	Y	N	N	
101A Office	W/T/P	NS	Y	N	N	
102 Office	W/T/P	NS	Y	N	N	
102A Office	W/T/P	NS	Y	N	N	
103 Reagent Lab	W/T/P	N	Y	N	N	RCRA ck. pts.
103A Special Bioassay	W/T/P	N	Y	N	Y	RCA/RMMA
105 Spike & Electroplating Prep.	W/T/P	NS	Y	Y	Y	RCRA /RMMA
106 Office	W/T/P	NS	Y	N	N	
107 Office	W/T/P	N	Y	N	N	
107A Office	W/T/P	NS	Y	N	N	
109 Office	N	N	Y	Y	N	CS 137
109A Storage	W/T	N	Y	N	N	CS 137
109B Storage	W/T	N	Y	N	N	CS 137
109C Storage	W/T	NS	Y	N	N	RCA/RMMA
111 Beryllium & Bacteriology	W/P	2.04	Y	N	Y	
112 Environmental Soil Lab	W/P	.55	Y	N	Y	RCA
113 Men's Restroom	P	NS	2700	N	N	
113A Janitor's Storage	P	NS	Y	N	N	
113B Men's Locker Room	P	NS	90	N	N	
115 Office	P	NS	4000	N	N	
121 Hallway near 103 & 133	W/P	N	Y	N	N	
121A Office	N	NS	Y	N	N	
122 Office	W/T/P	N	Y	N	N	
123 HPI Lab	W/T/P	NS	Y	N	N	RCA/RMMA
123A Hall to Exit Lockers	P	.37	Y	N	N	

Room Number	Asbestos >1%	Be ug/ft^2	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
124 Electroplating Lab	W/T/P	NS	Y	N	N	RCRA
125 Radioactive Spikes	W/T/P	NS	750	N	Y	
126 Gas Chromatograph	W/T/P	N	Y	N	N	RCA
126A Office	W/T/P	NS	Y	N	N	
126B Office	W/T/P	NS	Y	Y	N	
126C Office	W/T/P	NS	Y	N	N	
127 Bioassay	WT/P	NS	Y	N	Y	RCA/RMMA
128 Office	W/T/P	NS	Y	N	N	RCA/RMMA
129 Office	N	NS	Y	N	N	
131 Electronics Lab	W/P/T	N	Y	N	N	
131C Office	W/P/T	NS	2300	N	N	
132 East Utility Room	W	N	Y	N	N	
133 External Dosimetry	W/P/T	NS	Y	N	N	
133A Office	W/P/T	NS	Y	N	N	
133B Office	W/P/T	NS	Y	N	N	
133C Office	W/P/T	NS	Y	N	N	
135 Alpha Spec. & Liquid Scint. Lab	W/P/T	NS	Y	N	N	RCA: Tritium & C-14
137 Small Room at Truck Dock	N	NS	Y	N	N	
138 Office	N	NS	Y	N	N	
139 SE Entry Airlock	T	NS	Y	N	N	-
140 Hallway near 140A	T/P	NS	Y	N	N	
140A Office	T/P	NS	10	N	N	
141 Office	W/T	NS	Y	N	N	
142 Office	W/T	NS	Y	N	N	
143 Office	T	NS	Y	N	N	
143A Office	T	NS	Y	N	N	
144 Office	W/T	NS	Y	N	N	
146 Office	W/T	NS	Y	N	N	
147 Office	W/T	NS	Y	N	N	RCA; lead bricks

Room Number	Asbestos >1%	Be ug/ft2	Lead Paint ppm	Rad. Cont.	Acids Used	Misc.
150 Office	W/T	NS	180	N	N	
151 Office	W/T	NS	Y	N	N	
154 SW Entry Vestibule	W/T	NS	Y	N	N	
155 Office	W/T	N	830	N	N	
155A TLD Irradiator	N	NS	Y	N	N	Sealed Gamma Source
156 Use of Radioactive Spikes, etc.	W/T	NS	Y	N	Y	
157 Environmental Sample Prep. Lab	W/T	N	120	Y	Y	RCA; RCRA
158 Sample Receiving Station	W/T	N	270	N	N	RCA
159 West Utility Room	W	N	Y	N	N	
160 Office	W/T	NS	Y	N	N	
161 Office	W/T	NS	7300	N	N	
162 Office	W/T	NS	Y	N	N	
162A Office	W/T	NS	Y	N	N	
162B Office	W/T	N	Y	N	N	
163 Air Sample Counting Room	W/T	N	Y	N	N	RCA/RRMA
164 Hallway in front of 163	W/T	NS	Y	N	N	
165 Computer Room (SE corner)	W/T	NS	10	N	N	

The Radiological Contamination Survey Forms are available upon request.

1.5.4 Lead Paint Inspection and Sampling

A complete lead inspection and sampling event of Building 123 was conducted in April 1997 and is documented in the report titled *Lead Characterization Report for Building 123*, Rev. 0, May 1,1997. The analysis of paints included total lead, chromium, cadmium and arsenic. A total of 21 paint samples were collected from the building. Results indicated that 20 of 21 samples demonstrated detectable levels of lead. Although questions have been raised regarding waste disposal practices, computer modeling and leachability studies have demonstrated that lead in paint, if it exists, will not create a landfill disposal problem.

1.5.5 Beryllium Sampling

Beryllium metal was removed from Building 123 facilities during the deactivation process. Historically, Be was handled in Rooms 111 and 112. Sampling activities for Be were conducted in the building in February and again in June 1997. The results of the sampling effort demonstrated that all results recorded were well below the RFETS site housekeeping level of 25 ug/ft^2. Three swipes taken showed trace results (.37 to 2.04 ug/ft^2) in Rooms 123A, 111, and 112. The first decommissioning effort in these rooms will be to wipe down and thoroughly clean all surfaces. This effort is to remove any dust on equipment which may contain lead(Pb) or Be.

1.5.6 PCB Evaluation

A walkdown of Building 123 was conducted on June 16,1997 to assess the presence of PCB items in the building. The only suspect items identified include light ballasts and gasket materials associated with the HVAC system for the building. Building 123 fluorescent lights and light ballasts will be removed and disposed in accordance with appropriate RFETS procedures. Gasket materials will be assessed at the time of their removal and managed as waste as necessary.

The B123 Cluster Decommissioning Project Specific HASP contains information on how the above information will be implemented as the decommissioning effort is completed.

2.0 BUILDING 123 PHYSICAL DESCRIPTION

2.1 SUMMARY DESCRIPTION OF THE BUILDING 123 CLUSTER

The main structure in the Building 123 Cluster (Figure 2-1) is Building 123, a bioassay laboratory and a dosimetry counting and distribution facility. Associated structures include Building 113, a medical records storage facility (which originally served as a guard shack); Building 114, a small outdoor shelter; and Building 123S, a metal storage unit for containerized waste. Building locations are indicated in Figure 2-2. This section describes the physical arrangement of principal buildings in the Building 123 Area, including architectural and structural features, significant equipment, environmental control systems and safety aspects of each building.

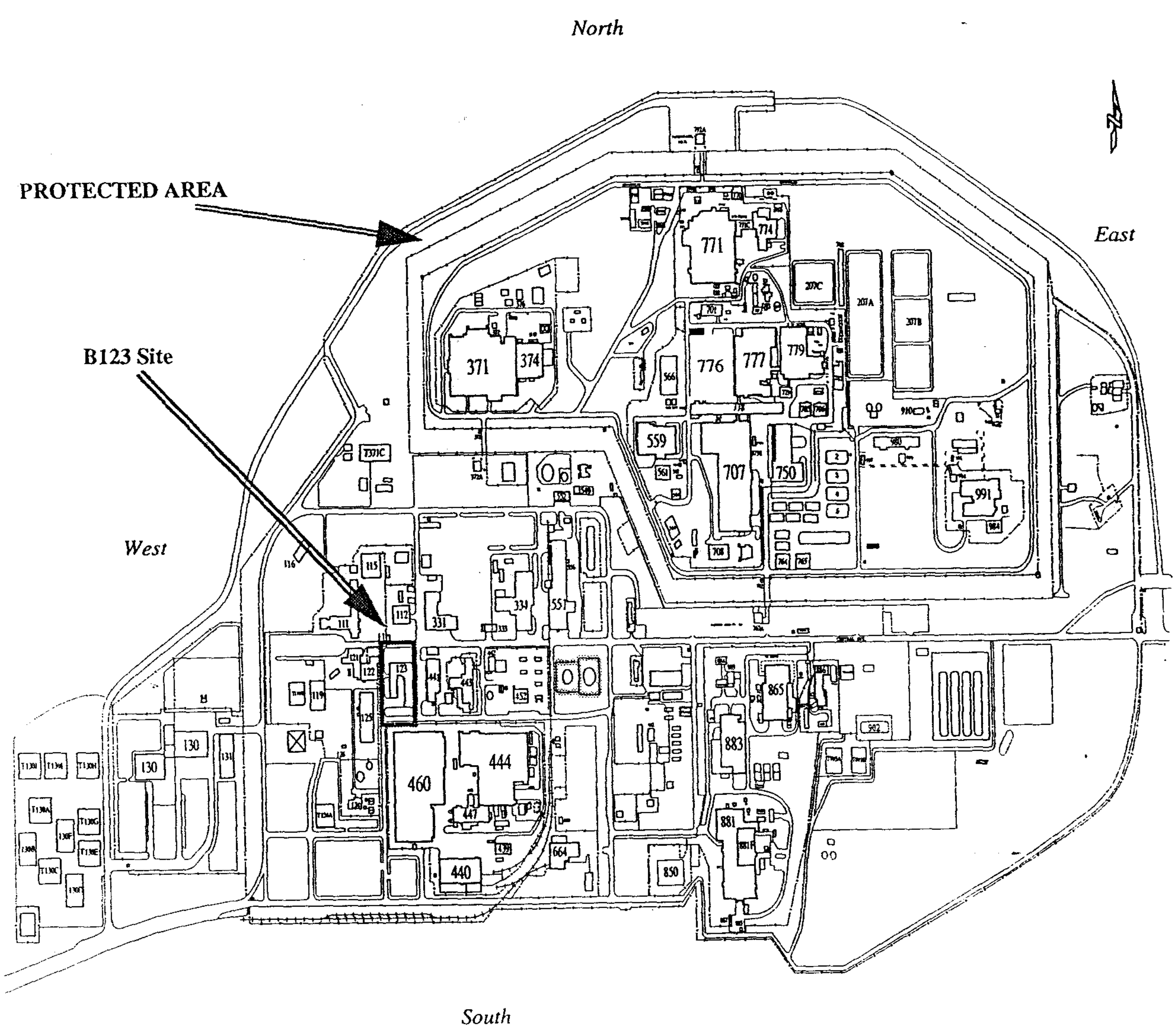

Figure 2-1 Building 123 Area Location

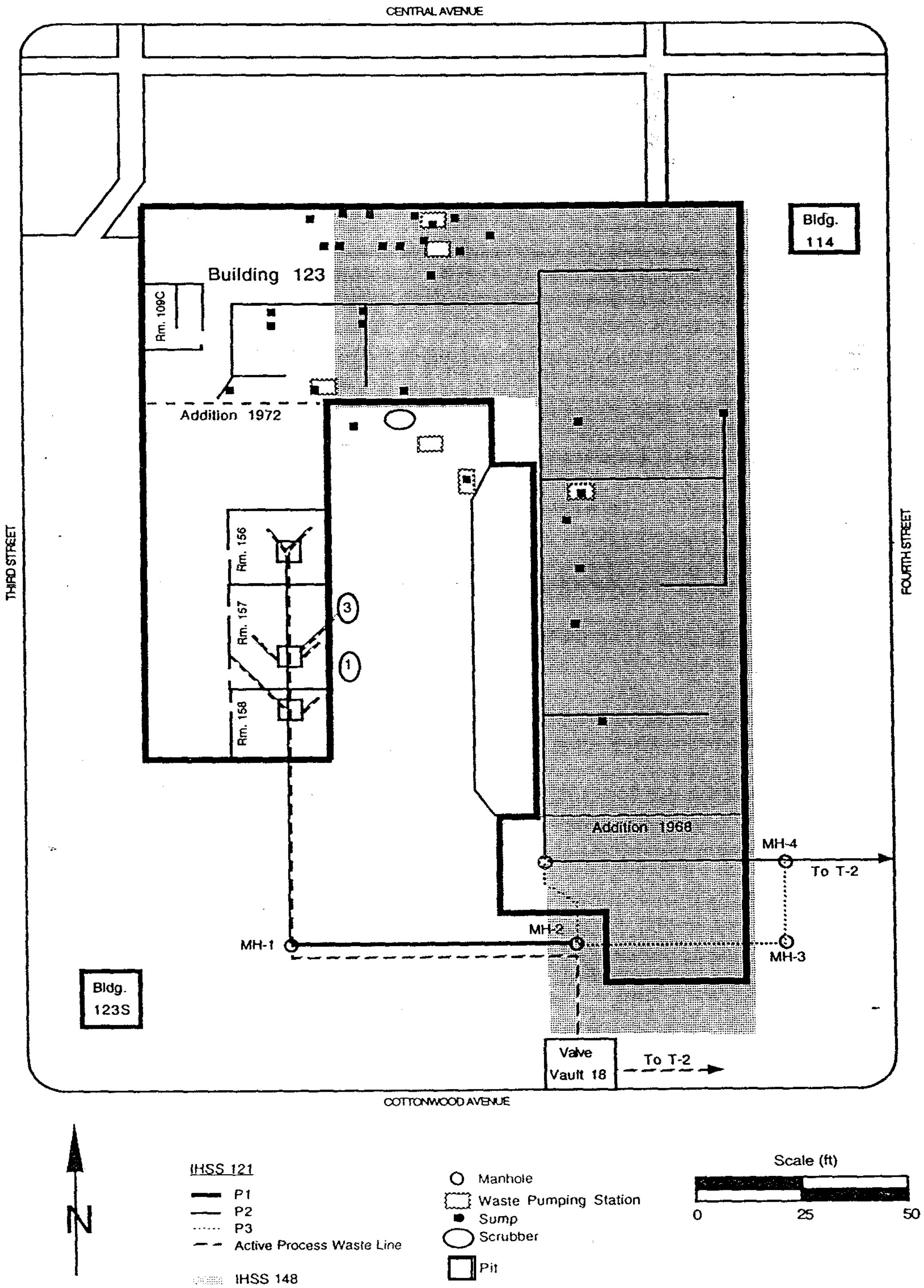

Figure 2-2 Building 123 Area Map

Building 123 is located on Central Avenue between Third and Fourth Streets (Figure 2-1). Figure 2-2 indicates the location of the building relative to other RFETS facilities. The building has been in use since its original construction in 1953, with additions completed in 1968, 1972, and 1974. The general areas of the building and approximate construction dates are:

East and North Wing (Rooms 100-135) - 1952
Addition to East Wing (Rooms 139-151) - 1968
West Wing (Rooms 154-163) - 1972
Addition to East Wing (Room 165) - 1974

Currently, the facility covers approximately 19,000 square feet and is a single level building constructed on grade with approximately 14 foot ceilings. Construction material is mostly concrete with a built-up asphalt roof. Modifications have been made to the building interior after the original construction of each area. Areas have been remodeled including installation and removal and partition walls, laboratory fixtures and other items. Sections of piping have been installed, removed and modified during the life of the facility. In addition, piping insulation in some areas has been replaced. Therefore, the possibility exists for a specific system, room or area to contain both asbestos containing materials (ACM) and non-ACM.

Heating, ventilating, and air conditioning (HVAC); electricity; gas and compressed air; steam; water; process waste; sewer; fuel oil; and fire protection utility systems serve the building.

2.2 SPECIFIC DESCRIPTION OF THE BUILDING 123 CLUSTER

2.2.1 Foundations

Foundations for Buildings 123 and 113 are horizontal, poured-in-place, reinforced concrete-spread footings that vary in depth from 3 feet to 9 feet below grade. Reinforced concrete grade beams, 16 inches to 18 inches wide and 10 inches to 13 inches thick, rest on the spread footings. Concrete grade walls 10 1/2 inches to 12 inches thick and 4 feet. 6 inches deep support the exterior walls. Foundations for Building 123S and 114 consist of horizontal, poured-in-place, reinforced concrete slabs on grade.

2.2.2 Structural Framing

Framing members used in Buildings 123 and 113 include columns constructed of metal beams resting on slab footings and supporting corrugated walls and ceilings. The majority of the beams are painted with industrial epoxy paint. The structural framing in Building 123S consists of steel I-beams resting on a reinforced concrete slab on grade. Building 114 is constructed of concrete blocks resting on reinforced concrete slab on grade.

2.2.3 Exterior Walls

Exterior walls of Buildings 123 and 114 are made of concrete blocks. The walls are not insulated. Outer surface of the concrete walls are painted. Exterior walls of Building 123S are composed of sheet metal. The walls are not insulated. The outer surface of the sheet metal walls are painted. Exterior walls of Building 113 are composed of stucco rock and concrete over concrete block walls. The walls are not insulated.

2.2.4 Floors

The floor slabs in Building 123, 123S, 113 and 114 are poured-in-place, reinforced concrete 6 to 8 inches thick, with a barrier on a gravel base.

2.2.5 Roofs

The Building 123 roof is a built-up membrane, constructed of corrugated sheet metal and tar. Building 123S is constructed with sheet metal. Buildings 113 and 114 are built-up membranes, constructed of corrugated sheet metal, tar and pea gravel.

2.2.6 Interior Walls

Most interior walls in Building 123 are corrugated metal, concrete (shared walls with exterior walls) and cementitious board. Some hallways and offices have 1/2 inch chalk pressboard over concrete and/or corrugated metal walls. The interior walls are not insulated. Four interior/exterior walls (1/4 inch maximum thickness) in Building 123S are constructed of sheet metal and are not insulated. Interior walls in Building 114 consist of non-insulated concrete blocks. Building 113 has cementitious board over concrete walls. The walls in Building 113 are not insulated.

2.2.7 Ceilings

Ceilings in offices and hallways in Buildings 123 and 113 are comprised of suspended acoustical tile. Ceilings in Buildings 123S and 114 are constructed of sheet metal.

2.2.8 Doors

Most of the personnel doors in Building 123 are either solid steel, steel with louvers, or steel with safety glass windows. Building 123S consists of two steel doors. Buildings 113 and 114 consist of two steel doors with safety glass windows. All doors in Buildings 123, 123S, 113 and 114 are enclosed in an aluminum frame.

2.2.9 Windows

There are approximately 90 exterior windows in Building 123. Building 123S does not have windows. Building 114 has four windows. Building 113 has four windows (each approximately 3 X 12 feet). All exterior windows in Buildings 123, 123S, 113 and 114 are enclosed in an aluminum frame.

2.2.10 Surface Finishes

Most interior and exterior walls in Buildings 123, 123S, 113 and 114 are painted. Floors in Buildings 123S and 114 are unpainted concrete. Building 113 has carpet over unpainted concrete. Most hallways in Building 123 consist of asbestos tile over concrete. Approximately seventeen (17) labs consist of asbestos tile over concrete, twenty-seven (27) offices with carpet over tiles and twenty-three (23) offices with asbestos tile over concrete.

3.0 GENERAL OPERATING HISTORY

3.1 OPERATING HISTORY OF BUILDINGS 123, 113, 114, AND 123S

3.1.1 Building 123

Building 123 was one of the first ten (10) buildings constructed at Rocky Flats. Analytical laboratory, dosimetry and instrument calibration activities have been conducted in Building 123 since construction of the building in 1953. Building 123 also provides office space for radiation health specialists, storage for all radiological health records, a laboratory for calibration and repair of criticality alarms and other repair/calibration shops. Building 123 once housed medical research until such operations were relocated to Building 122.

The operation of the analytical laboratory generates approximately 95 percent of the building waste and stores the majority of hazardous chemicals, with minor contributions from the External Dosimetry (ED) and Health Physics Instrumentation (HPI) Sections. Standard utility services have also generated small amounts of waste in the past.

The analytical laboratory analyzes environmental (air, water, soil, and vegetation), biological (urine, fecal material, and nose swipes), health physics (room air), and industrial hygiene samples (Be and organic vapors in room air), while the HPI Section repairs and calibrates radiation-detection instruments. The ED Section processes thermoluminescent dosimeters (TLDs) and film badges. The Radiological Records Section maintains occupational radiation exposure and dose records for radiation workers.

The analytical laboratory procedures involve digesting samples to purify and concentrate the radiological constituents. Sample preparation operations generated the bulk of the building waste. Combustibles, rubber gloves, and broken glass generated in the Radioactive Materials Management Areas (RMMAs) were placed in accumulation areas for eventual handling and removal as low-level waste. Some sample waste and rinse solutions were washed down the process drain for subsequent treatment in Building 774 (in Building 374 after 1983). Liquid organic wastes were placed in special bottles and stored in satellite accumulation areas prior to transfer to the RCRA 90-day storage building and eventual shipment to Liquid Waste Operations. RCRA wastes were also collected in Satellite Accumulation Areas (SAAs); located in Rooms 103A, 124, 125, 127, and 156. Wastes generated in non-RMMAs and monitorable lab trash were deposited in dumpsters for disposal in the RFETS landfill.

Hazardous chemicals associated with Building 123 operations included nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, ammonium thiocyanate, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate.

During the past forty-four (44) years, building operations have resulted in varying degrees of radioactive and chemical contamination within the building. For example, interviews with Building 123 occupants indicate that in the late 1960's or early 1970's, a liquid containing cesium was spilled on the concrete floor in Room 109C. The floor was sealed to immobilize the contamination. Also, leaks or spills have potentially contaminated the soil adjacent to and beneath the building (see Section 3.2.3).

3.1.2 Building 113

Building 113 is a guardhouse that has been converted to office space (see Figure 2-2). Constructed of concrete with a flat roof, the building is similar to four other guardhouses that have already been removed from RFETS. No internal processes were located in this building. A Reconnaissance Level Characterization Survey of this building focused on bulletproof glass in the windows and the potential for lead-based paint on the blinds. No asbestos could be identified in the survey. However, potential exists for the presence of PCBs in the light ballasts.

3.1.3 Building 114

Building 114 is a small shelter used by RFETS employees as a waiting area for offsite transportation. The building encloses about 25 square feet. It is constructed of masonry blocks with a flat roof. There are no utilities associated with this building, and records indicate that the building has served no other function.

3.1.4 Building 123S

Building 123S is a metal shed on a concrete slab. The shed encloses approximately 60 square feet. It was formerly used as a RCRA 90-day storage area by laboratories in Building 123. Organic wastes such as toluene and DDCP were stored there. The facility has been closed for approximately one (1) year. No waste or other material is currently stored in the shed. No utility hookups exist in the building. A visual inspection of the shed did not reveal any hazards associated with the structure.

3.2 RCRA AND COMPREHENSIVE ENVIRONMENTAL RESPONSE AND LIABILITY ACT (CERCLA) DESIGNATED AREAS

3.2.1 RCRA Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, the plant-wide process waste system, a network of tanks and underground and overhead pipelines constructed to transport and temporarily store process wastes from point of origin to onsite treatment and discharge points. RCRA Unit 40 includes all overhead and underground and process waste lines in and around Building 123. Sections of Original Process Waste Lines (OPWLs) were replaced prior to 1975 by either overhead lines or double-contained sections. Abandonment was documented by completed engineering drawings. In 1989, the process waste transfer system was upgraded. Sections of the overhead waste system were removed and replaced or converted to the new system. Contamination was not detected in any of the removed sections, and thus the sections were disposed at a sanitary landfill.

3.2.2 IHSS 121

The Building 123 area includes CERCLA-designated IHSS 121. IHSS 121 consists of RCRA Unit 40 underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3. The lines transferred the following process waste from Building 123:

- <u>Acids:</u> nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), and perchloric acid ($HClO_4$);
- <u>Bases:</u> ammonium hydroxide (NH_4OH) and sodium hydroxide (NaOH);
- <u>Solvents:</u> acetone, alcohols, cyclohexane, toluene, xylenes, triisooctomine, and ether;
- <u>Radionuclides:</u> various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm);
- <u>Metals:</u> beryllium (Be) (trace amounts); and
- <u>Others:</u> ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs).

OPWL P-1

Line P-1 was installed in 1968 and abandoned in June 1982. P-1 consists of a 3-inch polyethylene pipe inside a 4-inch steel pipe. Total length has been reported as 180 feet and 120 feet, with outside lengths of 89 feet and 120 feet. Line P-1 exits the south side of the west wing of Building 123 and extends east along the south side of the building.

Two manholes associated with P-1 were investigated in March 1994. The first manhole, located south of the west wing of Building 123, contains a north-south pipeline that appeared to be an active transfer line. The pipeline is approximately 5 feet below ground surface. The second manhole, associated with P-1 and P-2, is located south of the east wing of Building 123, and is approximately 5 feet deep. Pipes enter the manhole from the north, south, and east. All have been terminated and filled with concrete. According to current utility layout plans, a portion of the P-1 line exiting south of the west wing of Building 123 has been converted to the new process waste system.

The 1986 OPWL Closure Plan indicated that no reportable releases have occurred at P-1. However, the entire pipeline was identified on a location map in the 1988 Closure Plan as an area of reported release.

OPWL P-2

Line P-2 was installed in approximately 1952 or 1953 and decontaminated, removed, and replaced with inspectable pipe in June 1982. P-2 consists of a 4-inch cast iron pipe. Total length has been reported as 452 feet, with outside lengths of 92 feet and 158 feet. P-2 exits the south end of the east wing of Building 123, and connects to P-1 and P-3 at the southeast corner of the wing. Records indicate that the pipeline has undergone at least two modifications. A utility layout drawing indicates that Building 123 and pipes P-2 and P-3 have been extended south.

Reports indicate releases from P-2 beneath Building 123, and the entire pipeline has been identified on the location map as an area of reported release.

OPWL P-3

Line P-3 was installed in 1952 and was decontaminated, removed, and replaced with inspectable pipe in June 1982. P-3 consists of a 4-inch vitrified clay pipe with a total length of 162 feet. P-3 exits the manhole southeast of the east wing of Building 123 and connects with OPWL Tank T-2 in Building 441.

No known releases from P-3 have been recorded. However, the entire pipeline was identified on a location map in the 1988 Closure Plan as an area of reported release.

3.2.3 IHSS 148

IHSS 148 was part of former Operable Unit No. 13 (OU13) and is located beneath Building 123. IHSS 148 was established as a result of reported small spills of nitrate-bearing wastes along the east side of the building. Leaks in the process waste line may have contributed to potentially-contaminated soil beneath the building. A detailed characterization was conducted from September 1993 to February 1995 as part of a Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI). The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys.

Thirty-four (34) analytes were detected in the surface soil survey, including twenty-six (26) inorganic compounds and eight radionuclides.

The soil-gas survey was conducted on a 25-foot grid in accordance with the OU13 RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan. Sixty-four (64) soil-gas locations were sampled during the survey. 13 samples contained volatile organic compound (VOC) levels in excess of the 1 μg/L method detection limit. Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the west and east wings of the building. Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2.6 μg/L. Tetrachloroethane (PCE) was detected at 1.5 μg/L in a sample collected to the east of Building

123. The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate. Analyses results indicate that subsurface infiltration precluded full evaporation.

3.3 IDENTIFIED BUILDING HAZARDS

The Reconnaissance Level Characterization survey identified no significant hazards associated with Buildings 123S, 113 and 114. Therefore, this discussion focuses on Building 123. Building 123 has approximately 75 rooms or areas which are utilized as laboratories, dosimetry areas, calibration areas, storage for records and equipment, and office space. Potential hazards in the building are summarized in Appendix A. These hazards were identified by a review of the facility's documents and a walkdown of the building by project personnel, assisted by building personnel knowledgeable of the facility's past.

Most of the potential hazards identified during the reconnaissance level characterization survey will be removed or eliminated during the preparatory activities prior to this project.

1. All ACM will be removed by a separate licensed contractor prior to building decommissioning.

2. The fluorescent light ballast will be inspected for PCBs prior to building decommissioning. Should the ballasts contain regulated levels of PCBs, they will be removed by the decommissioning contractor and packaged and shipped to a TCSA-regulated disposal facility by RMRS Waste Management.

3. The liquid nitrogen system will be deactivated and the pressurized cylinders removed at the time the building tenants are relocated.

4. Laboratory chemicals will be removed when the building tenants are relocated.

5. Any material left in the building after the tenants depart will be addressed as part of this project.

6. Once the buildings are ready for decommissioning, utilities and facility safety systems will be disconnected by Site Power and Maintenance.

3.3.1 Asbestos

Asbestos Containing Materials (ACM) were inspected by a State certified inspector the week of April 7, 1997. This inspection is documented in Asbestos Characterization Report Addendum to Building 123 Inspection (April 1997). The inspection and evaluation was conducted in accordance with the guidelines specified in Asbestos Hazard Emergency Response Act (AHERA) and in compliance with the US Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and the State of Colorado regulations covering asbestos inspections. Abatement will be conducted by a contracted State qualified abatement company.

The following ACM sources and approximate volumes will be abated prior to the initiation of decommissioning: Thermal System Insulation (900 linear feet), Cementitious Wall Board (3,450 square feet), Drywall with tape and compound (4,000 square feet), Resilient Flooring (10,600 square feet), Gray Paper Duct Insulation (100 square feet), and Mastic under Counter (40 square feet). Building 123 Asbestos Characterization Report, a subpart of the building's Reconnaissance Characterization Report, documents this complete process.

3.3.2 Beryllium

Two laboratories, Rooms 111 and 112, processed beryllium contaminated samples as part of environmental soil sampling tests. These areas were sampled (39 samples taken) by qualified beryllium sampling technicians and sent to an external analytical laboratory for analysis. No samples identified the presence of beryllium above the RFETS site housekeeping level of 25 ug/ft^2. The sample results are documented in Table 1-1 of this report.

3.3.3 Chemicals

The chemicals in Building 123 are associated with the operations currently within that facility. They are being tracked by the RFETS Chemical Tracking Group under the "Right-to-Know" provisions of SARA and are being managed by the laboratories. These chemicals will be removed at the time active laboratory operations cease. Any chemicals remaining will be addressed by the RFETS Chemical Tracking Group which will utilize or lab-pack for disposal. The current inventory of the building includes nitric acid, hydrochloric acid, hydrofluoric acid, oxalic acid, ammonium hydroxide, formic acid, perchloric acid, toluene, isopropyl alcohol, DDCP, ammonium thiocyanate, methanol, mercury, lead, cadmium, beryllium, sodium hydroxide, and potassium permanganate.

3.3.4 RCRA Hazardous Waste in SAAs

The Satellite Accumulation Areas (SAAs) contain RCRA hazardous waste that was generated by the operations within the room in which it is stored. This waste will be characterized by "Process Knowledge" because the custodian is knowledgeable of all material that went into each SAA waste stream and has kept each waste segregated since generation. These waste streams are further tracked by the Site's SAA tracking system and is audited internally. This waste must be properly packaged, labeled, and shipped for storage or disposal prior to closing the accumulation areas.

Representative waste types for each area are summarized as follows:

Room 103A - Combustibles, waste isopropanol, DDCP/toluene
Room 124 - Liquid waste methanol, isopropanol
Room 125 - DDCP/toluene, isopropanol contaminated with toluene
Room 127 - Hydrochloric acid, hydrofluoric acid, ethanol
Room 156 - Combustibles, waste toluene/DDCP, isopropanol

3.3.5 Perchloric Acid

Perchloric acid hoods (5) occupy four rooms (105, 112, 127 and 157 (2)) within Building 123. Over the years, perchloric acid may have crystallized in the hoods. The crystalline form may be shock sensitive and represents a potential physical hazard to the workers. To mitigate this hazard, the hoods and duct work will be flushed and the rinsate directed to the Site waste water treatment plant.

3.3.6 Pressurized Gas Cylinders and Liquid Nitrogen

Pressurized gas cylinders are used by the laboratories. Removal of these cylinders prior to the decommissioning effort will be conducted by the laboratory personnel when they are relocated. The liquid nitrogen system will also be disconnected and removed as part of this project by RFETS personnel when the utilities are disconnected.

3.3.7 Polychlorinated Biphenyls (PCBs)

PCBs may have been utilized in the light ballasts. Thus far, no other system has been identified in Building 123 with the potential of having PCBs present in the components. The light ballasts will be evaluated for PCBs once the building has been vacated and the lights are no longer needed. Should the light ballasts contain regulated concentrations of PCBs the decommissioning contractor will be required to remove the ballasts. They will be packaged and shipped by RMRS Waste Management.

3.3.8 Radiological Contaminated Materials

Radiological assessments have been conducted in Building 123 by RFETS Radiological Operations. The following areas have Radiological Material Management Areas (RMMA) mostly in laboratory hoods: Rooms/Labs 103A, 105, 112, 124, 125, 156, 157, and 163. Radiological Contamination Areas (RCAs) are in Room/Labs 103A, 105, 112, 123, 124, 125, 126, 127, 135, 149, 155A, 156, 157, 158, 163. Radiological sources are kept in Rooms/Labs 123, 126, and 155A. All of these areas are being managed for their radiological characteristics. Specific survey data has been included for each room in Table 3-3. Results listed can be compared to the unrestricted release values in Table 3-4.

3.3.9 Metals

Metals (specifically lead, chromium, cadmium, and arsenic) were sampled from selected painted surfaces in Building 123 for industrial hygiene purposes. Site historical knowledge and the accredited inspector's knowledge were utilized in the sampling process. Twenty-one samples were taken and analysis was conducted by Atomic Absorption Spectroscopy by a third independent party. All paints indicated detectable levels of one or more of the metals.

Table 3-3 Radiological Survey Summary (in dpm/100 cm^2)

TBD = To Be Determined

Room Number	Removable		Total		
	Alpha	Beta	Alpha	Beta/Gamma	Below Unrestricted Limits Release
100 West Entry	<18	<205	<60	1137	YES
101 Office	<18	<205	<60	<455	YES
101A Office	<18	<205	<60	<455	YES
102 Office	<18	<205	<60	<455	YES
102A Office	<18	<205	<60	<455	YES
103 Reagent Lab	<18	<205	<60	<455	YES
103A Special Bioassay	<18	<205	<60	<455	YES
105 Spike & Electroplating Prep.	<18	<205	<60	124,200	NO
106 Office	<18	<205	<60	1,101	NO
107 Office	<18	<205	<60	<455	YES
107A Office	<18	<205	<60	<455	YES
109 Office	<18	<205	<60	9,072	NO
109A Storage	<18	<205	<60	<455	YES
109B Storage	<18	<205	<60	<455	YES
109C Storage	<18	<205	<60	<455	YES
111 Beryllium & Bacteriology	<18	<205	<60	540	YES
112 Environmental Soil Lab	<18	<205	<60	<455	YES
113 Men's Restroom	<18	<205	<60	603	YES
113A Janitor's Storage	<18	<205	<60	<455	YES
113B Men's Locker Room	<18	<205	<60	<455	YES
115 Office	<18	<205	<60	951	YES
119 Ladies Bathroom	<18	<205	<60	906	YES
122 Office	<18	<205	<60	<455	YES
123 HPI Lab	<18	<205	<60	<455	YES
123A Hall to Exit Lockers	<18	<205	<60	7920	NO
124 Electroplating Lab	<18	<205	<60	<455	YES

Room Number	Removable		Total		
	Alpha	Beta	Alpha	Beta/Gamma	Below Unrestricted Limits Release
125 Radioactive Spikes	<18	<205	<60	600	NO
126 Gas Chromatograph	<18	<205	<60	<455	YES
126B Office	<18	<205	<60	<455	YES
126C Office	<18	<205	<60	603	YES
127 Bioassay	<18	<205	<60	<455	YES
128 Office	<18	<205	<60	<455	YES
131 Electronics Lab	<18	<205	120	681	YES
131C Office	<18	<205	<60	<455	YES
132 East Utility Room	<18	<205	<60	1359	YES
133 External Dosimetry	<18	<205	<60	675	YES
133A Office	<18	<205	<60	<455	YES
133B Office	<18	<205	<60	<455	YES
135 Alpha Spec. & Liquid Scint. Lab	<18	<205	<60	<455	YES
137 Small Room at Truck Dock	<18	<205	<60	843	YES
138 Office (Sm. Rm. at Truck Dock)	<18	<205	<60	783	YES
139 SE Entry Airlock	<18	<205	<60	<455	YES
140 Hallway near 140A	<18	<205	<60	<455	YES
140A Office	<18	<205	<60	<455	YES
141 Office	<18	<205	<60	<455	YES
142 Office	<18	<205	<60	<455	YES
143 Office	<18	<205	<60	<455	YES
143A Office	<18	<205	<60	<455	YES
146 Office	<18	<205	<60	<455	YES
147 Office	<18	<205	<60	<455	YES
149 Office	<18	<205	<60	1,035	YES
150 Office	<18	<205	<60	<455	YES
151 Office	<18	<205	<60	<455	YES

Room Number	Removable		Total		
	Alpha	Beta	Alpha	Beta/Gamma	Below Unrestricted Limits Release
154 SW Entry Vestibule	<18	<205	<60	<455	YES
155 Office	<18	<205	<60	<455	YES
155A TLD Irradiator	<18	<205	<60	792	YES
156 Use of Radioactive Spikes, etc.	<18	<205	<60	<455	YES
157 Environmental Sample Prep. Lab	<18	<205	<60	804	YES
158 Sample Receiving Station	<18	<205	<60	<455	YES
159 West Utility Room	<18	<205	<60	<455	YES
160 Office	<18	<205	<60	<455	YES
161 Office	<18	<205	<60	<455	YES
162 Office	<18	<205	<60	<455	YES
162A Office	<18	<205	<60	<455	YES
162B Office	<18	<205	<60	<455	YES
163 Air Sample Counting Room	<18	<205	<60	<455	YES
164 Hallway in front of 163	<18	<205	<60	933	YES
165 Computer Room (SE corner)	<18	<205	<60	<455	YES
Entry 129 (NE entry)	<18	<205	<60	3087	YES

Lead bricks and shielding are located through the radiological areas to lower the background and protect personnel. The largest volume of lead is used to shield detectors and sources. This material will be removed by the source owners or dispositioned through the DCI Property Utilization and Disposition Department.

Building 123 was used for R&D in support of nuclear weapons production. Although a wide variety of activities were conducted in the building, large quantities of radioactive materials were not processed.

Contamination is expected from Pu, U, and other materials processed in Building 123 laboratories. In addition, a wide variety of chemicals were used for laboratory tests. Many of these chemicals still remain in the building and are planned for removal through the deactivation process.

Polychlorinated Biphenyls are also likely to be encountered in equipment and electrical devices. Due to the age of the facility, considerable amounts of asbestos are present in the insulation and building materials. Lead is also present in the glovebox shielding and in some of the building materials.

3.4 DESCRIPTION OF OPERATIONS

This section describes the research and development (R&D), and support operations which were previously conducted in Building 123. Because research operations were constantly changing during facility operations, only a general description of them is provided. Operations are separated into 14 general areas of responsibility and are described below by room number.

3.4.1 Room 158 Receiving Station

Room 158 functioned as the primary receiving point for radioactive and non-radioactive materials coming into Building 123. These materials are in the form of office supplies, building supplies, environmental samples, process area samples, laboratory reagents, electronic and dosimetry components and radioactive laboratory standards. This area has previously been used for storage of radioactive materials and LLW receptacles.

3.4.2 Room 157 Sample Preparation Laboratory

Room 157 was the first environmental preparation laboratory. Environmental waters, stack filters and ambient air samples are prepared. Radioactive spikes of 1 ml. are added to samples in this room. Filters are spiked and then burned within a furnace, then further dissolved in hyperchloric acid. Liquid samples and pre-electroplating solutions are taken to dryness by heating in the laboratory fume hoods. Columns are then run to precipitate out the various radionuclides.

Room 157 is a double module containing six laboratory hoods for sample preparation. Four standard type hoods, one large process hood in the center of the room and a low-level fume hood for non-radiological work are present.

3.4.3 Room 156 Sample Preparation Laboratory

The function of Room 156 is essentially the same as Room 157. Room 156 has a walk-in freezer for storage of routine bioassay samples. Additional preparation of the pre-electroplating samples is accomplished within a fume hood.

Historically, Room 156 was used for analysis of samples obtained during human autopsies. Detailed smear and direct surveys performed in March 1991 and in June 1997 have indicated that no residual contamination exists.

3.4.4 Room 163 Air Filter Counting Laboratory

Room 163 serves as the filter counting facility. Radiological Control Technicians (RCTs) count smears, swipes, and leak test samples in this room as well. Because of the possible activity of some air filter samples, self-monitoring is required prior to exiting the room. An Alpha Met survey instrument is located at the door for this purpose.

3.4.5 Room 155A TLD Irradiator Room

Room 155A houses the TLD irradiator used by the External Dosimetry program. The irradiator houses a 2 Curie Cesium 137 sealed source. Cs-137/Ba-137m is both a gamma emitter (0.662 MeV 85 percent yield) and a beta emitter (0.514 MeV Max). TLDs are loaded into an automatic sample changer which exposes them to the Cesium source sequentially. The exposure mechanism is automatic and the source does not leave the shielding under normal operating conditions. Room 155A is controlled for external gamma exposure only. The contact exposure rate on the TLD irradiator during operation is a maximum of 0.4 mR/hr.

3.4.6 Room 103A Special Bioassay Laboratory

Room 103A is the special bioassay lab. These bioassay samples are presumed to be radioactive because of the nature of the investigation. Pre-electroplating processes like those described for Rooms 156 and 157 take place here.

3.4.7 Room 105 Chemistry Development Laboratory

Room 105 is the research and development laboratory and the spike preparation room. Laboratory standardized solutions are stored in bulk within a locked safe. Some pre-electroplating preparation work is also done here.

3.4.8 Room 112 Special Environmental Laboratory

Room 112 is the special environmental laboratory. All soil work is done here as well as overflow from the other environmental labs. Room 112 is a secondary storage area for bioassay samples. Bioassay samples are stored in the laboratory freezer in Room 112 when the walk-in freezer in Room 165 is full.

Historically, Room 112 was used in dog autopsy studies. Detailed radiological surveys performed in 1991 and in June 1997 indicated that no residual contamination exists.

3.4.9 Room 123 Calibration Sources

Room 123 is used by Radiological Instrumentation for the storage of calibration sources for survey meter repair, calibration and performance checks.

3.4.10 Rooms 124 and 127

Rooms 124 and 127 are currently used as the electroplating facility. Final stages of electroplating preparation are performed on the bench top. Electro-disposition of all samples is then performed in the fume hood, fixing the sample residual to a small metal disk approximately the size of a dime. The average activity per electroplated sample planchet ranges from 5-10 dpm.

3.4.11 Room 125 Bioassay Laboratory

Room 125 functions as the standard bioassay preparation area. It is also used for tritium distillations. Tritium distillations are performed in a sealed distillation system apparatus. Routine urine and fecal samples are submitted to the Room 158 receiving station for analysis. Fecal samples are transferred to the walk-in freezer in Room 156. Volume reduction and purification of routine urine and fecal samples is performed in the hoods in Room 125. One ml of spike solution is added and Pu is extracted by ionic exchange. The extraction product is transferred in small volume covered beakers to Rooms 124 or 127 for electroplating.

3.4.12 Room 126 Gas Chromatography

Room 126 is designated as the nuclear spectroscopy room. Gas chromatography is the only radiological concern. Two gas chromatographs within the room use electron capture detectors containing Ni-63. The detectors are sealed making the material inaccessible. No other radioactive material is used within the room.

3.4.13 Room 135 Alpha Spectroscopy and Liquid Scintillation Counting

Room 135 is used for alpha spectroscopy and liquid scintillation counting. About 95-100 samples are processed weekly in Room 135. This includes routine count and special bioassay screening. Planchets produced in Room 124 are counted in Room 135, as are some samples prepared in Rooms 157,156,125, 103A, and 112. In addition, numerous planchets are kept in storage bins for reference purposes.

3.4.14 Room 149 Gamma Spectroscopy

Room 149 is used for gamma spectroscopy and all samples are multiple bagged or contained in rigid containers. Some calibration and check sources are stored in file cabinets in this room.

4.0 RADIOACTIVE AND HAZARDOUS CHARACTERISTICS

Location-specific information concerning the characterization of each area of the B123 Cluster and each room in Building 123 is presented in this section. This localized characterization includes descriptions of specific events, operations, installations, construction, equipment operation, and other process knowledge information relating to the 123 Cluster. The information collected in this section has been obtained from several sources, including past/current records and interviews with RFETS personnel which had relevant 123 Cluster work experience or related knowledge. A complete listing of the information sources examined for this report is provided in Section 5.0.

The inventory of radioactive materials within Building 123 are limited. In the radiation instrument calibration Room 123, various types of sources similar to other cold area calibration shops are used. All sources except tritium gas are of the electroplated or sealed source type. The lab rooms have liquid process waste sinks and piping which receive any unusable low level waste liquids, but there are no other systems in these labs considered to be potentially internally contaminated. Extensive surveys were performed of the laboratory fume hood interior surfaces, both alpha and beta smear and direct surveys in 1991 and again in June 1997. Internal surveys of the hoods were below detection limits and consequently the hoods are considered to be uncontaminated, and primarily function for industrial hygiene purposes rather than for radiological purposes.

Radioactive spike solutions were used as an additive during the preparation of most samples. The concentrations of the radioactive spike solutions used as a quality control mechanism in sample preparation are very low, with a maximum reported level of 10 dpm/ml. The diluted spike solutions were mixed from more concentrated solutions inside the Chemistry Development Room 105. Radiological contamination surveys conducted in June 1997 revealed elevated levels of fixed beta/gamma contamination (124,000 dpm) in the room around the sink and floor areas. It is suspected that the elevated areas may have resulted from a spill of concentrated spike material used in this room.

Actinide elements, compounds, sources and other radioactive materials historically used and stored include the following isotopes and other associated trace isotopes or radioactive decay products:

- Am-241
- Cs-137
- Sr-90
- H-3
- U-234
- U-235
- U-236
- U-238
- Pu-242
- Pb-210
- Ba-133
- Cf-250
- Gd-148
- Ni-63
- Cm-244
- Pu-238
- Pu-239
- Pu-240
- Pu-241

4.1 FACILITY WORK AREAS

Building 123 has been divided into work areas for the purpose of deactivation and decommissioning. The areas are as follows:

Area 1 - East and North Wing (Rooms 100-135), constructed in 1952

Area 2 - Addition to East Wing (Rooms 139-151), constructed in 1968

Area 3 - West Wing (Rooms 154-163), constructed in 1972

Area 4 - Addition to East Wing (Room 165), constructed in 1974

Building 114 - Bus Station

Building 113 - Guard shack/ Medical records storage

Building 123S - Metal storage shack

Exposure assessments of the hazards that may be encountered during specific decommissioning activities is discussed in the Building 123 Project HASP. Information contained in the Building 123 HASP and this document will be incorporated into the planning process of each activity (via Activity Hazard Analysis evaluations) to ensure maximum protection of the worker.

4.2 FACILITY CHARACTERIZATION

The following chart (Appendix A) is organized by decommissioning areas described above and includes a description of the operation and process information available for each room and area, the materials that were used in the room based on historical information, the contamination considerations for each room, and the confirmation analysis which was performed prior to and during decommissioning activities. Additional characterization information will be obtained using the decommissioning characterization protocols. The types and volumes of wastes generated during the Building 123 decommissioning is discussed in the Building 123 project Waste Management Plan.

4.3 QUALITY ASSURANCE PROGRAM

The Quality Assurance Program for characterization activities follows the same program established for management of hazardous wastes onsite and meets the minimum requirements established by *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, U. S. Environmental Protection Agency, SW-846, 1986, Third Edition. Quality Assurance (QA)/Quality Control (QC) procedures addressing waste characterization are maintained at the site.

4.3.1 Waste Management

The requirements for characterization of hazardous waste is specified in several waste management procedures that are based on the requirements established primarily by 40 CFR 261 and 6 CCR 1007-3, 261. If the waste materials tested demonstrate hazardous or radioactive characteristics, then they will be managed in accordance with the Low-Level or Hazardous Waste Requirements Manual. A more thorough discussion of the project's waste management is in the Building 123 project Waste Management Plan (Doc. No. RF/RMRS-97-029).

4.3.2 Health and Safety/Industrial Hygiene

All decommissioning activities are reviewed in the context of potential exposure of workers to hazards within the facility. Exposure assessments are discussed in the Building 123 project HASP.

5.0 INFORMATION SOURCES

The preparation of this report involved the retrieval, from various sources, and review of several documentation files pertaining to the building and past operations therein. The following sections list the files that have been reviewed in the course of this reconnaissance characterization.

This investigation effort also included the collection of first-hand process knowledge interviews from RFETS employees with Building 123 experience. A listing of personnel who contributed first-hand information is available in the project files.

5.1 FACILITY RECORDS

The following building records are available for retrieval from the Building 123 Decommissioning Project Document Files:

- *Building 123 Routine Radiological Monitoring Contamination Survey Reports*, dated January 1990 through present.
- Building 123 Waste Stream Residue Identification and Characterization (WSRIC).

5.2 FACILITIES ENGINEERING RECORDS

- Basic Information for the Decommissioning of Building 123.
- Facilities Engineering Drawings of Building 123.
- Facilities photographs from walkdowns conducted April 1997.

5.3 FIRST-HAND PROCESS KNOWLEDGE INFORMATION

RFETS staff members previously/currently assigned to/or associated with Building 123:

Process information on operations within the Building 123 was obtained from various individuals associated with the project. A complete listing of persons contacted during the building characterization is available in the project files.

6.0 REFERENCES

Basic Information for the Decommissioning of Building 123.

Building 123 Radiological Monitoring Contamination Survey Reports, dated January 1990 and June 1997.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO.

DOE, 1996, *RFETS Ten Year Plan.*

DOE, *Waste Stream and Residue Identification and Characterization for Building 123.*

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO.

Draft NRC NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Termination.*

EPA, 1994, *Guidance for the Data Quality Objective Process*, EPA, QA/G-4.

Facilities photographs from walkdowns conducted in April 1997.

Facilities Engineering Drawings of Building 123.

K-H, June 1996, *Rocky Flats Environmental Technology Site Radiological Control Manual.*

K-H, 1997, *Decommissioning Program Plan*, (DRAFT).

RMRS, 1997, "Building 123 Decommissioning Project Health and Safety Plan", Rev. 0.

RMRS, 1996, "Low-Level Waste Management Plan", 44-RWP /EWQA - 0014, Rev. 1.

RMRS, 1997, *Building 123 Reconnaissance Level Characterization Report*, August 1997.

RMRS, 1997, "Building 123 Decommissioning Project Waste Management Plan", Rev. 0.

U. S. Department of Energy. 1995. "Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area, Data Summary No. 2".

U. S. Department of Energy. 1995. "Phase I RFI/RI Work Plan for Operable Unit 9, Original Process Waste Lines".

U. S. Department of Energy. 1995. "Phase I RFI/RI Work Plan for Operable Unit 9, Outside".

Appendix A

Building 123 Characterization

Appendix A—Building 123 Characterization

Room Number	Process Information	Radioactive and/or Hazardous & ACM Materials Used	Surveys/Samples Conducted
100	WEST ENTRY	Cementitious "Transite" wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
101	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
101A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
102	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
102A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
103	REAGENT LAB	Cementitious wall board, floor tile, pipe insulation, perchloric acid hoods, RCRA Check pts.	Asbestos PLM Test: 10% RAD Survey, Be Smears, Pb paint
103A	SPECIAL BIOASSAY	Same as above; RCA/RMMA; isopropanol, DDCP, Toluene; RCRA area	Asbestos PLM Test: 100% RAD Survey & Acids. Be Smears
105	SPIKE AND ELECTROPLATING PREP.	Cementitious walls, floor, pipe; RCRA/RMMA; Perchloric Acid Hood: Nitric acid; RCRA Check Pt.	Asbestos PLM Test: 100 RAD Survey & Acids
106	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
107	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey, Be Smears
107A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
107B	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
109	OFFICE AREA	Cementitious floor tile, walls; Possible CS 137 Spill	Asbestos PLM Test: 10% RAD Survey, Be Smears
109A	STORAGE	Cementitious floor tile, walls; Possible CS 137 Spill	Asbestos PLM Test: 100 RAD Survey, Be Smears
109B	STORAGE	Cementitious floor tile, walls; Possible CS 137 Spill	Asbestos PLM Test: 100% RAD Survey
109C	STORAGE	Cementitious floor tile, walls; RCA/RMMA	Asbestos PLM Test: 100% RAD Survey

Room Number	Process Information	Radioactive and/or Hazardous & ACM Materials Used	Surveys/Samples Conducted
111	BERYLLIUM AND BACTERIOLOGY	Cement walls, pipe insulation, Beryllium: RCRA cabinets: ACIDS	Asbestos PLM Test: 100% RAD Survey: Be Smears: Acids
112	ENVIRONMENTAL SOIL LAB	RCA/RMMA: Cement walls, pipe insulation, Beryllium, perchloric acid hoods (2), RCRA Area: RAD drums	Asbestos PLM Test: 100% RAD Survey: Be Smears
113	MEN'S RESTROOM	Pipe insulation	Asbestos PLM Test: 10% RAD Survey, Pb Paint
113A	JANITOR'S STORAGE ROOM	Pipe insulation	Asbestos PLM Test: 10% RAD Survey
113B	MEN'S LOCKER ROOM	Pipe insulation	Asbestos PLM Test: 10% RAD Survey, Pb Paint
121	HALLWAY NEAR 103 & 133	Pipe insulation, Cementitious walls	Asbestos PLM Test: 10% RAD Survey, Be Smears
121A	OFFICE AREA	NONE	Asbestos PLM Test: 10% RAD Survey
122	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey, Be Smears
123	HPI LAB CONTAINS RAD SOURCES	Same as above; previous RCA/RMMA	Asbestos PLM Test: 10% RAD Survey
123A	HALL TO EXIT LOCKERS	Pipe insulation	Asbestos PLM Test: 100% RAD Survey, Be Smears
124	ELECTROPLATING LAB	Cementitious walls, pipe insulation, floor tiles, methanol, isopropanol; RCRA Area	Asbestos PLM Test: 100% RAD Survey
125	RADIOACTIVE SPIKES, TRITIUM DISTILLATIONS, BIOASSAY FOR URINE	Cement walls, cabinet and hood, pipe insulation; DDCP, toluene, isopropanol; Acids/bases	Asbestos PLM Test: 100% RAD Survey: Acids, Pb Paint
126	GAS CHROMATOGRAPH (CONTAINS NI-63 SOURCE)	RCA; Cement walls, floor tile, pipe insulation; Nitrogen Dewar	Asbestos PLM Test: 100% RAD Survey
126A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey, Be Smears
126B	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey

Room Number	Process Information	Radioactive and/or Hazardous & ACM Materials Used	Surveys/Samples Conducted
126C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
127	BIOASSAY/URINE	RCA/RMMA, HCL, HF, TICL3, Ethanol; Acids	Asbestos PLM Test: 100% RAD Survey: Acids
128	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
128A	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
129	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
131	ELECTRONICS LAB	RAD Sources: Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 100% RAD Survey, Be Smears
131C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey, Pb Paint
132	EAST UTILITY ROOM	Cementitious walls	Asbestos PLM Test: 10% RAD Survey, Be Smears
133	EXTERNAL DOSIMETRY	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
133A	OFFICE AREA	Cementitous wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
133B	OFFICE AREA	Cementitous wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
133C	OFFICE AREA	Cementitious wall board, floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
135	ALPHA SPEC. AND LIQUID SCINT. LAB	RCA: RAD Sealed Sources; Tritium & C-14	Asbestos PLM Test: 100% RAD Survey
137	SMALL ROOM AT TRUCK DOCK	Gas cylinder storage	Asbestos PLM Test: 10% RAD Survey
138	OFFICE AREA	Gas cylinder storage	Asbestos PLM Test: 10% RAD Survey
139	SE ENTRY AIRLOCK	Floor tile	Asbestos PLM Test: 10% RAD Survey
140	HALLWAY NEAR 140A	Floor tile, pipe insulation	Asbestos PLM Test: 10% RAD Survey
140A	OFFICE AREA	Floor tile	Asbestos PLM Test: 10% RAD Survey, Pb Paint

Room Number	Process Information	Radioactive and/or Hazardous & ACM Materials Used	Surveys/Samples Conducted
141	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test:: 10% RAD Survey
142	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
143	OFFICE AREA	Floor tile	Asbestos PLM Test: 10% RAD Survey
143A	OFFICE AREA	Floor tile	Asbestos PLM Test: 10% RAD Survey
144	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
146	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
147	OFFICE AREA	RCA; Sealed Source; lead bricks; drywall joint compound; floor tile	Asbestos PLM Test: 100% RAD Survey
150	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey, Pb Paint
151	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
154	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
155	OFFICE AREA	Nitrogen Dewars; drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey, Be Smears, Pb Paint
155A	TLD IRRADIATOR/ CONTAINS A SEALED GAMMA SOURCE W/IN A SHIELDED IRRADIATOR	RCA; Sealed Sources	Asbestos PLM Test: 100% RAD Survey
156	USE OF RADIOACTIVE SPIKES, BIOASSAY, ROUTINE FECAL	RCA/RMMA, Toluene, DDCP, isopropanol, acids, bases, perchloric acid hoods (2)	Asbestos PLM Test: 100% RAD Survey, acids
157	ENVIR. SAMPLE PREP. LAB, USE OF RADIOACTIVE SPIKES, STACK AIR, AMBIENT AIR, SURFACE WATER SAMPLES	RCA: RCRA Area/Rad drums, perchloric acid hoods (4)	Asbestos PLM Test: 100% RAD Survey, Be Smears, Pb Paint

Room Number	Process Information	Radioactive and/or Hazardous & ACM Materials Used	Surveys/Samples Conducted
158	SAMPLE RECEIVING STATION	RCA	Asbestos PLM Test: 100% RAD Survey, Be Smears, Pb Paint
159	WEST UTILITY ROOM	Drywall joint compound	Asbestos PLM Test: 10% RAD Survey, Be Smears
160	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
161	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey, Pb Paint
162	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
162A	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
162B	OFFICE AREA	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey, Be Smears
163	AIR SAMPLE COUNTING ROOM	RCA/RMMA	Asbestos PLM Test: 100% RAD Survey, Be Smears
164	HALLWAY IN FRONT OF 163	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey
165	COMPUTER ROOM (SE CORNER)	Drywall joint compound; floor tile	Asbestos PLM Test: 10% RAD Survey, Pb Paint

Attachment 8

Certification of Closure for the Building 123 Components of RCRA Unit 40

RMRS Rocky Mountain Remediation Services, L.L.C.
... protecting the environment
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, Colorado 80402-0464
Phone: (303) 966-7000

CORRES. CONTROL LTR. NO.		
K-H Corres. #		
Originator Ltr Log #		
TAH-002-98		
DIST.	LTR	ENC
BENSON C A		
CARMEAN, C H		
CRAWFORD, A.C.		
DAWSON D		
FINDLEY, M.E.		
FITZ, R C		
GUINN, L.A.		
HUGHES, F. P.		
LAW, J. E.		
MILLS, S H.		
OVERLID, T. W.		
PATTERSON, J.W.		
SUTTON, S. R.		
TRICE, K. D.		
WHEELER, M.		
WOLF, K. Z.	X	
HOPKINS, T.A.	X	X
AEC FILE	X	X
ADMIN RECORD	X	X
RMRS RECORDS	X	X
TRAFFIC		
PATS/T130G		
CLASSIFICATION:		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		
AUTHORIZED CLASSIFIER SIGNATURE:		
Date:		
IN REPLY TO RF CC NO.:		
ACTION ITEM STATUS: q PARTIAL/OPEN q CLOSED		
LTR APPROVALS:		
...G & TYPIST INITIALS: DLH:dlu		
RF-46469(Rev.1/98)		

June 1, 1998

Randy Leitner, Program Manager
Compliance & Performance Assurance
Kaiser-Hill Company, L.L.C.
Building T130C

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CERTIFICATION OF CLOSURE FOR THE COMPONENTS OF RCRA UNIT 40 IN BUILDING 123 - TAH-002-98

Rocky Mountain Remediation Services, L.L.C., (RMRS) is submitting the attached Certification of Closure for the Building 123 Components of RCRA Unit 40. Closure activities were performed as part of the Building 123 Decommissioning Project. All closure activities were conducted in accordance with the applicable requirements for interim status units defined in 6 CCR 1007-3, Park 265, and the Closure Plan for Building 123 Components of RCRA Unit 40, November 1997, (Closure Plan). The Closure Plan was approved by the Colorado Department of Health and Environment (CDPHE) on January 8, 1998.

Closure activities included the following:

1) Removing above ground process waste lines and ancillary equipment, and disposing of them as listed mixed waste.

2) Decontaminating sumps, pipe chases, and underground process waste lines.

As stated in Section 5.0 of the attached report, closure requirements were achieved for the above ground piping and ancillary equipment, and the sumps and pipe chases in Rooms 156, 157, and 158. The sump in Room 125 and the underground piping did not meet closure performance standards. Remediation of the sump in Room 125 and the underground piping will be deferred to environmental restoration activities for IHSS 121, 148 and the building slab. Data from soil samples, from groundwater monitoring, and from rinsate analysis from the sump and piping will be evaluated to rank the IHSSs and to determine what, if any, remediation will be required for this area. As required by the regulations and the Closure Plan, closure activities were evaluated and certified by an independent, Colorado-registered professional engineer.

Please transmit this certification report to CDPHE at your earliest convenience. A draft transmittal letter is attached for your use. If you have questions, please contact me at 966-7652, or Dorthea Hoyt at 966- 6742.

Ted A. Hopkins

Ted A. Hopkins. Manager,
Environmental Compliance

DLH:dlu

Attachments:
As Stated

cc w/attachments:

K. A. Dorr
K. North

DRAFT **DRAFT** **DRAFT**

June xx, 1998

Mr. Joe Schieffelin, Unit Leader
Hazardous Waste Monitoring and Enforcement
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80222-1530

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CERTIFICATION OF CLOSURE FOR THE COMPONENTS OF RCRA UNIT 40 IN BUILDING 123 - KSN-xxx-98

Dear Mr. Schieffelin:

The U.S. Department of Energy, Rocky Flats Field Office (DOE, RFFO) and Kaiser-Hill L.L.C. are submitting the enclosed Certification of Closure for the Building 123 Components of RCRA Unit 40. Closure activities were performed as part of the Building 123 Decommissioning Project. All closure activities were conducted in accordance with the applicable requirements for interim status units defined in 6 CCR 1007-3, Park 265, and the Closure Plan for Building 123 Components of RCRA Unit 40, November 1997, (Closure Plan). The Closure Plan was approved by the Colorado Department of Health and Environment (CDPHE) on January 8, 1998.

Closure activities included the following:

1) Removing above ground process waste lines and ancillary equipment, and disposing of them as listed mixed waste.

2) Decontaminating sumps, pipe chases, and underground process waste lines.

As stated in Section 5.0 of the attached report, closure requirements were achieved for the above ground piping and ancillary equipment, and the sumps and pipe chases in Rooms 156, 157, and 158. The sump in Room 125 and the underground piping did not meet closure performance standards. Remediation of the sump in Room 125 and the underground piping will be deferred to environmental restoration activities for IHSS 121, 148 and the building slab. Data from soil samples, from groundwater monitoring, and from rinsate analysis from the sump and piping will be evaluated to rank the IHSSs, the under building contamination (UBC), and to determine what, if any, remediation will be required for this area. As required by the regulations and the Closure Plan, closure activities were evaluated and certified by an independent, Colorado-registered professional engineer.

Please transmit this certification report to CDPHE at your earliest convenience. A draft transmittal letter is attached for your use. If you have questions, please contact Randy Leitner at 966- 3537.

Robert April, Group Lead
Stakeholder & Environmental Liaison
DOE, RFFO

Karan North, Division Manager
Environmental Manager & Compliance
Kaiser-Hill Company, L.L.C.

Attachment II

CERTIFICATION OF CLOSURE FOR THE BUILDING 123 COMPONENTS OF RCRA UNIT 40

Prepared By:
Rocky Mountain Remediation Services, L.L.C.

Certified By:
Dennis Pontius, P.E., EnviroTemps, Inc.

CERTIFICATION OF CLOSURE
FOR THE BUILDING 123 COMPONENTS OF
RCRA UNIT 40

REVISION 0

MAY 1998

CERTIFICATION OF CLOSURE
FOR THE BUILDING 123 COMPONENTS OF RCRA UNIT 40

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	INTRODUCTION	1
3.0	HISTORICAL OVERVIEW AND WASTE CHARACTERIZATION	2
4.0	CLOSURE CERTIFICATION ACTIVITIES	2
5.0	COMPARISON OF SAMPLE RESULTS TO CLOSURE PERFORMANCE STANDARDS	3
6.0	CONCLUSIONS AND CLOSURE CERTIFICATION	8
7.0	REFERENCES	9

APPENDICES

Appendix A - Floor Plan of RCRA Unit 40 piping in Building 123
Appendix B - Analytical Results.

1.0 EXECUTIVE SUMMARY

RCRA Unit 40 in Building 123 is an interim status unit. Closure was done in accordance with the Closure Plan for Building 123 Components of RCRA Unit 40, November 1997 (Closure Plan) and the requirements of the Colorado Hazardous Waste Regulations, 6 CCR 1007-3, Part 265.

All above-ground components of RCRA Unit 40 in Building 123 were removed and managed as RCRA listed mixed waste in accordance with Option 2 of the Closure Plan. This waste will be sent to an approved Treatment Storage and Disposal Facility (TSDF) for disposition.

Closure of the pipe chases and sumps in Room 156 and 158 was done in accordance with Option 1 (decontamination) of the Closure Plan. Analytical testing confirmed that these components met RCRA Clean Closure Standards.

Closure of the pipe chases and sump in Room 157 was also done accordance with Option 1 of the Closure Plan. Analytical testing showed that nickel was present at 111 ppb which is 11 ppb above the Tier 2 standard. Since nickel is not identified as a contaminant of concern nor is it a RCRA regulated hazardous waste, CDPHE has determined that no further action will be required for Sump 157.

Closure of the sump in Room 125 and the underground piping did not meet the Closure Performance Standards. The rinsate sample for Room 125 exceeded standards for lead and rinsate sample for the underground piping exceeded standards for chromium and lead. Remediation of the Room 125 sump and the underground piping will be deferred to the Environmental Restoration (ER) Department. ER will evaluate data from soil samples, groundwater monitoring, and the rinsate analysis to rank Individual Hazardous Substance Sites (IHSS's) 121, 148, and the under building contamination (UBC) associated with Building 123. This evaluation will determine what, if any, remediation will be required for these areas.

2.0 INTRODUCTION

The purpose of this report is to verify completion of RCRA Closure operations and to certify closure of the Building 123 components of RCRA Unit 40 that have met RCRA clean closure standards.

RCRA Unit 40 is the site-wide network of tanks, pipelines, and sumps, constructed to transport and temporarily store process waste from the point of origin to on-site treatment and discharge points. The Building 123 component of RCRA Unit 40 consisted of regulated process waste lines (above and below grade), sumps, and pump stations. This process waste system was used to transport laboratory wastes generated in Building 123, to Building 374 for treatment.

Closure of RCRA Unit 40 in Building 123 (an interim status unit) was done in accordance with the Closure Plan for Building 123 Components of RCRA Unit 40, November 1997 (Closure Plan) and the requirements of the Colorado Hazardous Waste Regulations, 6 CCR 1007-3, Part 265. The Closure Plan was approved by the Colorado Department of Public Health and Environment (CDPHE) on January 8, 1998. Partial closure of RCRA Unit 40 was an element of a larger project to decommission Buildings 123, 113, 114, and 123S. This project was conducted as an accelerated remedial action approved under the Building 123 Proposed Action Memorandum (PAM). The PAM is a decision document for the decommissioning of Building 123 and was approved by CDPHE on August 25, 1997.

Rocky Mountain Remediation Services, L.L.C., retained an independent Professional Engineer from EnviroTemps (ET) to witness the closure activities and perform this certification. This report provides evidence to support the closure determinations by the Owner/Operator and verification by an independent Professional Engineer (PE), as required by 6 CCR 1007-3, Section 265.115, for RCRA closure of an interim status unit.

3.0 HISTORICAL OVERVIEW AND WASTE CHARACTERIZATION

Building 123 was constructed in 1953 and was used as an analytical laboratory, dosimetry, and instrument calibration facility. The building also was used for medical research, storage for all radiological health records, office space for radiation health specialists, and a laboratory for calibration of criticality alarms. The process waste system in Building 123 was used from 1953 through 1997 when the building was decommissioned.

The building was modified several times through its operation. The process waste system was modified in 1968 when a extension to the east wing was built, in 1972 when the west wing was added to the building, in 1974 when portions of the above-ground piping were installed and old underground lines were grouted, in 1989 when the underground line to Valve Vault 18 was replaced, and finally in 1995 when various upgrades were made to the above-ground piping. A detailed description of the history of the process system in Building 123 can be found in the Closure Plan.

The process waste system incorporated into RCRA Unit 40 included the system components in Rooms 103, 103A, 105, 111, 112, 113B, 121, 123, 123A, 125, 126C, 127, 155, 155B, 156, 157, and 158; the active underground line (double walled pipe) between Room 158, Valve Vault 18, and Tank D-853 in Building 428; sumps in Rooms 125, 156, 157, and 158, and pipe chases in Room 156, 157, and 158.

The Closure Plan describes the waste streams which were disposed of in the Building 123 component of RCRA Unit 40, and also provides a list of EPA waste codes used in the building.

4.0 CLOSURE CERTIFICATION ACTIVITIES

4.1 BUILDING 123 RCRA CLOSURE TEAM

Closure activities were conducted in February and March 1998 by Resource Technologies Group (RTG) under subcontract to Denver West Remediation and Construction (DWRC) and Kaiser-Hill. RMRS provided management and technical support of the Building 123 Decommissioning project for Kaiser-Hill. As stated above, RMRS subcontracted independent Professional Engineering services from EnviroTemps.

4.2 CLOSURE OPTIONS

The Closure Plan listed three options for closure of RCRA Unit 40 in Building 123 which are summarized below. Details may be found in the Closure Plan and in the Construction Package for Building 123 Strip-Out.

Option 1 - Decontamination using a solution capable of removing the contaminates of concern and testing the final rinsate to verify treatment standards according to the Rocky Flats Environmental Technology Site (RFETS) RCRA Permit, Part 10, Closure, Section C, "Clean Closure by Decontamination".

Option 2 - Manage as RCRA mixed waste with no on-site treatment.

Option 3 - Debris treatment as defined by RFETS RCRA Permit, Part 10, Closure, Section D, "Debris Rule Decontamination".

4.3 BUILDING 123 CLOSURE ACTIVITIES

RCRA Unit 40 in Building 123 was divided into three major components for closure.

Above-ground system components. All above-ground process waste piping (steel and PVC), pumps, and polyethylene pump containments were managed under Option 2. These system components were stripped-out and packaged in waste crates as low level mixed waste for subsequent disposal at an approved and permitted Treatment Storage and Disposal Facility (TSDF).

Pipe chases and sumps. The pipe chases and sumps were managed under Option 1. First the pipe chases and sumps were washed with a solution of trisodium phosphate and sodium carbonate. The volume of solution used was approximately 3 times the volume of the chases and sumps. The chases and sumps were then liberally rinsed with water. Finally, a specified volume of water which did not exceed 5% the capacity of each pipe chase and sump was used as a final rinse. Composite samples of the rinsate were collected for analysis. Three composite samples were collected: one for each sump and associated pipe chases in Room 156, 157, and 158. A separate sample was collected for the sump in Room 125 (Room 125 does not have any pipe chases). All waste generated during the pipe chase and sump closure activities was routed to the process waste system downstream of the closure activities (Building 374) or packaged as a listed mixed waste.

Underground piping. The underground piping was managed under Option 1. This piping begins in Room 158, where the process waste system exits Building 123. It drains to Valve Vault 18, passes through Valve Vaults 17 and 16, and discharges to Tank D-853 in Building 428. This entire stretch of piping was washed with a solution of trisodium phosphate and sodium carbonate. The volume of solution used was approximately 3 times the volume of the piping and the D-853 tank. The piping was then liberally rinsed with water. Finally, a specified volume of water which did not exceed 5% the capacity of the piping and Tank D-853, was used as a final rinse. A sample of the rinsate was collected from the D-853 tank for analysis.

5.0 COMPARISON OF SAMPLE RESULTS TO CLOSURE PERFORMANCE STANDARDS

5.1 SUMMARY OF CLOSURE PERFORMANCE STANDARDS

The Closure Performance Standards are defined in the Closure Plan. A summary of the Closure Performance Standards is provided below.

Option 1: Decontamination.

1. An appropriate solution must be used for decontamination.

2. The system must be flushed with the decontamination solution to remove trace amounts of acids or bases.

3. Rinsate samples must be evaluated against the final rinsate closure performance standards from the Rocky Flats Cleanup Agreement (RFCA) Permit, Part X.

4. The final rinsate volume must not exceed 5% of the capacity of the system.

5. All visible waste residuals must be removed.

6. The final rinsate concentrations of priority pollutants and heavy metals must be below the Tier 2 action levels as defined in Attachment 5 of RFCA.

7. The pH of the rinsate must be between 6 and 9.

Option 2: Dispose as Mixed Waste

1. Waste generated must be managed as RCRA mixed waste with EPA Waste Codes of F001, F002, and F005.

2. The waste generated must be managed in accordance with applicable state and federal regulations.

Option 3: Debris Treatment

Since Option 3 was not used during the closure of RCRA Unit 40 in Building 123, the Closure Performance Standards will not be summarized.

5.2 COMPARISON OF CLOSURE ACTIVITIES WITH THE PERFORMANCE STANDARDS

The following is a comparison of each major component of RCRA Unit 40 in Building 123 to the Closure Performance Standards. This comparison demonstrates whether the unit may be closed. Tables summarizing all the sample analytical results may be found in Appendix A.

5.2.1 Above-ground system components.

1. All above-ground process waste piping and ancillary equipment was packaged as mixed waste with the waste code F001, F002 and F005.

2. Since the above-ground piping was handled according to Option 2 (managed as a hazardous waste) it was sampled for Land Disposal Restriction (LDR) standards according to 40 CFR 268.40 and 268.48. Samples of both the PVC and the steel pipe were collected. All pipe was determined to comply with the LDR standards.

Conclusion: The above-ground components of RCRA Unit 40 met the Closure Performance Standards. Waste generated has been managed as RCRA mixed waste with EPA Waste Codes of F001, F002, and F005, and the packaged waste is being managed in accordance with RFETS procedures, which meet applicable state and federal regulations for on-site storage at a TSDF.

5.2.2 Pipe Chases and Sump in Room 156

1. A solution of trisodium phosphate/sodium carbonate was used for decontamination.

2. The pipe chases and the sump in Room 156 were adequately flushed with the decontamination solution to remove trace amounts of contaminants of concern as identified in the Closure Plan.

3. The rinsate sample has been evaluated against the performance standards from the RFCA Permit, Part X. The comparison can be found in Appendix B.

4. The final rinsate volume used in the pipe chases did not exceed 6 pints. The final rinsate volume used in the sump did not exceed 25 gallons. These volumes are less than 5% of the capacity of the components.

5. All visible waste residuals were removed during washing and rinsing of the sump. The pipe chases were not visible.

6. No contaminants were found to exceed Tier 2 Action levels. As shown in Appendix B, the final rinsate concentrations of priority pollutants and heavy metals were below the Tier 2 action levels as defined in Attachment 5 of RFCA.

7. All rinsate was processed in the permitted, on-site, liquid waste treatment plant at Building 374.

Conclusion: Closure of the pipe chases and sump in Room 156 meet the Closure Performance Standards.

5.2.3 Pipe Chases and Sump in Room 157

1. A solution of trisodium phosphate/sodium carbonate was used for decontamination.

2. The pipe chases and the sump in Room 157 were adequately flushed with the decontamination solution to remove trace amounts of contaminants of concern as identified in the Closure Plan.

3. The rinsate sample has been evaluated against the performance standards from the RFCA Permit, Part X. The comparison can be found in Appendix B.

4. The final rinsate volume used in the pipe chases did not exceed 19.5 pints. The final rinsate volume used in the sump did not exceed 44 gallons. These volumes are less than 5% of the capacity of the components.

5. All visible waste residuals were removed during washing and rinsing of the sump. The pipe chases were not visible.

6. As shown in Appendix B, no contaminants of concern were found to exceed Tier 2 action levels. Nickel was present at 111 ppb which is 11 ppb above the Tier 2 standard. Since nickel is not identified as a contaminant of concern, nor is it a RCRA regulated hazardous waste, CDPHE has determined that no further action will be required for the sump in Room 157 (documented in correspondence between K-H and CDPHE dated April 3, 1998).

7. All rinsate was processed in the permitted, on-site, liquid waste treatment plant at Building 374.

Conclusion: Closure of the pipe chases and sump in Room 157 meet the Closure Performance Standards.

5.2.4 Pipe Chases and Sump in Room 158

1. A solution of trisodium phosphate/sodium carbonate was used for decontamination.

2. The pipe chases and the sump in Room 158 were adequately flushed with the decontamination solution to remove trace amounts of contaminants of concern as identified in the Closure Plan.

3. The rinsate sample has been evaluated against the performance standards from the RFCA Permit, Part X. The comparison can be found in Appendix B.

4. The final rinsate volume used in the pipe chases did not exceed 10.5 pints. The final rinsate volume used in the sump did not exceed 31 gallons. These volumes are less than 5% of the capacity of the components.

5. All visible waste residuals were removed during washing and rinsing of the sump. The pipe chases were not visible.

6. No contaminants were found to exceed Tier 2 Action levels. As shown in Appendix B, the final rinsate concentrations of priority pollutants and heavy metals were below the Tier 2 action levels as defined in Attachment 5 of RFCA.

7. All rinsate was processed in the permitted, on-site, liquid waste treatment plant at Building 374.

Conclusion: Closure of the pipe chases and sump in Room 158 meet the Closure Performance Standards.

5.2.5 Sump in Room 125

1. A solution of trisodium phosphate/sodium carbonate was used for decontamination.

2. The sump in Room 125 was adequately flushed with the decontamination solution to remove trace amounts of contaminants of concern as identified in the Closure Plan.

3. The rinsate sample has been evaluated against the performance standards from the RFCA Permit, Part X. The comparison can be found in Appendix B.

4. The final rinsate volume used in the sump did not exceed 2 gallons. This volume is less than 5% of the capacity of the sump.

5. All visible waste residuals were removed during washing and rinsing of the sump.

6. As shown in Appendix B, the final rinsate concentrations of priority pollutants and heavy metals were below the Tier 2 action levels as defined in Attachment 5 of RFCA, except for lead. The rinsate concentration for lead was 56 ppb and the action level for lead is 15 ppb.

7. All rinsate was processed in the permitted, on-site, liquid waste treatment plant at Building 374.

Conclusion: Closure of the sump in Room 125 did not meet the Closure Performance Standards. Remediation of this sump will be deferred to the Environmental Restoration (ER) Department. ER will evaluate data from soil samples, groundwater monitoring, and the rinsate analysis to rank Individual Hazardous Substance Sites (IHSS's) 121, 148 and the under building contamination (UBC) associated with Building 123. This evaluation will determine what, if any, remediation will be required for this area.

5.2.6 Underground Pipe from Room 158, Building 123 to Tank D853 in Building 428.

1. A solution of trisodium phosphate/sodium carbonate was used for decontamination.

2. The piping was adequately flushed with the decontamination solution to remove trace amounts of contaminants of concern as identified in the Closure Plan.

3. The rinsate sample has been evaluated against the performance standards from the RFCA Permit, Part X. The comparison can be found in Appendix B.

4. The final rinsate volume used in the piping and tank did not exceed 113 gallons. This volume is less than 5% of the capacity of the piping and Tank D853.

5. The piping is underground and therefore not visible for inspection.

6. As shown in Appendix B, the final rinsate concentrations of priority pollutants and heavy metals were below the Tier 2 action levels as defined in Attachment 5 of RFCA, except for chromium and lead. The analysis of the rinsate revealed 588 ppb chromium and 21.7 ppb lead remained within the underground portion of the line. The action level of chromium is 100 ppb, and the action level for lead is 15 ppb.

7. All rinsate was processed in the permitted, on-site, liquid waste treatment plant at Building 374.

Conclusion: Closure of the underground piping did not meet the Closure Performance Standards. Remediation of the underground piping will be deferred to the Environmental Restoration (ER) Department. ER will evaluate data from soil samples, groundwater monitoring, and the rinsate analysis to rank Individual Hazardous Substance Sites (IHSS's) 121, 148 and the under building contamination (UBC) associated with Building 123. This evaluation will determine what, if any, remediation will be required for this area.

6.0 CONCLUSION AND CLOSURE CERTIFICATION

Based upon observations and investigations presented in this report, the Closure Performance Standards stated in Section 5.0 of this report are accurate.

The undersigned hereby certifies the following:

1. The following components of RCRA Unit 40 in Building 123 at the Rocky Flats Environmental Technology Site met RCRA Clean Closure standards prescribed in the Closure Plan and meet the requirement of the Colorado Hazardous Waste Act (CHWA) regulations for RCRA closure under interim status, as defined in 6 CCR 1007-3, Section 265, Subpart G:

   - all above-ground piping, removable ancillary equipment and secondary containment.
   - sumps and pipe chases in Rooms 156, 157 and 158.

2. The following components of RCRA Unit 40 in Building 123 will be deferred to ER for ranking and future remediation as applicable:

   - the Sump in Room 125 (due to 56 ppb Pb).
   - the underground pipe from Building 123 to Building 428 (due to 588 ppb Cr and 21.7 ppb Pb).

Professional Engineer

5-28-98
Date

Dennis W. Pontius, P.E.
EnviroTemps, Inc.
555 Zang Street
Suite 104
Lakewood, CO 80228

COLORADO REGISTERED
DENNIS W. PONTIUS
31028
PROFESSIONAL ENGINEER

7.0 REFERENCES

Closure Plan for Building 123 Components of RCRA Unit 40 (Closure Plan), Revision 0, November 1997.

Construction Package for Building 123 Strip-Out, Revision 14, February 27, 1998.

Proposed Action Memorandum for the Decommissioning of Building 123 (PAM), Revision 6, dated March 26, 1998.

Waste Management Plan for Building 123, Revision 1, dated March 1998.

Appendix A - Floor Plan of RCRA Unit 40 piping in Building 123

Appendix B - Analytical Results

Appendix B - Analytical Results for the Sumps and Pipe Chases in Rooms 156, 157, and 158

Sample from rinsate from B123, Sump 156
SUMP 156
Sample # 98A0996-001

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
1,1 Dichloroethylene	0.5U	7.00E-03	7 ppb	NO	YES
1,1,2-Trichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
1-1-1-Trichloroethane	0.5U	2.00E-01	200 ppb	NO	YES
1-2-Dichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
2-Butanone (Methyl ethyl ketone)	2 U	2.47E+00	2470 ppb	NO	YES
Acetone	2 U	3.65E+00	3650 ppb	NO	YES
Aluminum, Al	137 Total	1.06E+02	106,000 ppb	NO	NO
Antimony, Sb	3.1 Total	6.00E-03	6 ppb	NO	NO
Arsenic, As	1.6 U Total	5.00E-02	50 ppb	NO	YES
Barium, Ba	21.9 Total	2.00E+00	2,000 ppb	NO	YES
Benzene	0.5 U	5.00E-03	5 ppb	NO	YES
Beryllium, Be	0.2 U Total	4.00E-03	4 ppb	NO	NO
Bromodichloromethane	5 Baseline Contaminant	1.00E-01	100 ppb	NO	NO
Cadmium, Cd	0.4 U Total	5.00E-03	5 ppb	NO	YES
Carbon disulfide	2.0 U	2.76E-02	27.6 ppb	NO	YES
Carbon tetrachloride	0.5U	5.00E-03	5 ppb	NO	YES
Chlorobenzene	0.5U	1.00E-01	100 ppb	NO	YES
Chloroform	38 E Baseline contaminant	1.00E-01	100 ppb	NO	YES
Chromium, Cr	0.51 Total	1.00E-01	100 ppb	NO	YES
Cobalt, Co	0.50 U Total	2.19E+00	2,190 ppb	NO	NO
Copper, Cu	0.70 U Total	1.30E+00	1,300 ppb	NO	NO
Ethylbenzene	0.5U	7.00E-01	700 ppb	NO	YES
Iron, Fe	59.7 Total	NA, not on Tier 2 Table	NA	NO	NO

SUMP 156
Sample Report Date 2/24/98
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
Lead, Pb	4.0 Total	Not found in RFCA Tier 2 Table	NA	The MCL for lead is 15 ppb.	YES? Under the Safe Drinking Water Act, 15 ppb is the MCL for lead.
Lithium, Li	4.7 Total	7.30E+01	73,000 ppb	NO	NO
Magnesium, Mg	3200 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Manganese, Mn	2.0 Total	1.83E-01	183 ppb	NO	NO
Mercury, Hg	0.10 Total	2.00E-03	2 ppb	NO	YES
Methylene chloride	0.5U	5.00E-03	5 ppb	NO	YES
Molybdenum, Mo	21.5 Total	1.83E-01	183 ppb	NO	NO
Nickel, Ni	0.60 U Total	1.00E-01	100 ppb	NO	NO
Potassium, K	1,000 Total	Not found in the RFCA Tier 2 Table	NA	NO	NO
Pyridine	70 U	Not on Tier 2 List	NA	Not on Tier 2 list.	YES
Selenium, Se	1.8 U Total	5.00E-02	50 ppb	NO	YES
Silver, Ag	10 U Total	1.83E-01	183 ppb	NO	YES
Sodium	7,510 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Strontium, Sr	114 Total	2.19E+01	21,900 ppb	NO	NO
Tetrachloroethylene	0.5 U	5.00E-03	5 ppb	NO	YES
Thallium, Tl	2.3 U Total	2.00E-03	2 ppb	NO	NO
Tin, Sn	10.4 Total	2.19E+01	21,900 ppb	NO	NO
Toluene	0.5U	1.00E+00	1000 ppb	NO	YES
Trichloroethylene	0.5U	5.00E-03	5 ppb	NO	YES
Vanadium, V	0.6U Total	2.56E-01	256 ppb	NO	NO
Vinyl chloride	0.5U	2.00E-03	2 ppb	NO	YES
Xylenes	0.5U	1.00E+01	10,000 ppb	NO	YES
Zinc, Zn	9.6 Total	1.10E+01	11,000 ppb	NO	NO

SUMP 156
Sample Report Date 2/24/98
Summarized Tuesday, March 24, 1998
Ted A Hopkins

Sample from rinsate from B123, Sump 157
SUMP 157
Sample # 98A0996-002 Metals 98A0996-002.012

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
1,1 Dichloroethylene	0.5U	7.00E-03	7 ppb	NO	YES
1,1,2-Trichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
1-1-1-Trichloroethane	0.5U	2.00E-01	200 ppb	NO	YES
1-2-Dichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
2-Butanone (Methyl ethyl ketone)	2 U	2.47E+00	2470 ppb	NO	YES
Acetone	2 U	3.65E+00	3650 ppb	NO	YES
Aluminum, Al	138 Total	1.06E+02	106,000 ppb	NO	NO
Antimony, Sb	1.4 U Total	6.00E-03	6 ppb	NO	NO
Arsenic, As	1.6 U Total	5.00E-02	50 ppb	NO	YES
Barium, Ba	21.9 Total	2.00E+00	2,000 ppb	NO	YES
Benzene	0.5 U	5.00E-03	5 ppb	NO	YES
Beryllium, Be	0.2 U Total	4.00E-03	4 ppb	NO	NO
Bromodichloromethane	5 Baseline Contaminant	1.00E-01	100 ppb	NO	NO
Cadmium, Cd	3.1 Total	5.00E-03	5 ppb	NO	YES
Carbon disulfide	2.0 U	2.76E-02	27.6 ppb	NO	YES
Carbon tetrachloride	0.5U	5.00E-03	5 ppb	NO	YES
Chlorobenzene	0.5U	1.00E-01	100 ppb	NO	YES
Chloroform	26 Baseline contaminant	1.00E-01	100 ppb	NO	YES
Chromium, Cr	13.2 Total	1.00E-01	100 ppb	NO	YES
Cobalt, Co	0.50 U Total	2.19E+00	2,190 ppb	NO	NO
Copper, Cu	4.8 Total	1.30E+00	1,300 ppb	NO	NO
Dibromochloromethane	0.7				
Ethylbenzene	0.5U	7.00E-01	700 ppb	NO	YES
Iron, Fe	152 Total	NA, not on Tier 2 Table	NA	NO	NO

SUMP 157
Sample Report Date 2 25 98
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
Lead, Pb	4.1 Total	Not found in RFCA Tier 2 Table	NA	The MCL for lead is 15 ppb.	YES? Under the Safe Drinking Water Act, 15 ppb is the MCL for lead.
Lithium, Li	4.2 Total	7.30E+01	73,000 ppb	NO	NO
Magnesium, Mg	3090 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Manganese, Mn	19.0 Total	1.83E-01	183 ppb	NO	NO
Mercury, Hg	0.10 U Total	2.00E-03	2 ppb	NO	YES
Methylene chloride	0.5U	5.00E-03	5 ppb	NO	YES
Molybdenum, Mo	21.5 Total	1.83E-01	183 ppb	NO	NO
Nickel, Ni	111 Total	1.00E-01	100 ppb	NO	NO
Potassium, K	1,010 Total	Not found in the RFCA Tier 2 Table	NA	NO	NO
Pyridine	70 U	Not on Tier 2 List	NA	Not on Tier 2 list.	YES
Selenium, Se	1.8 U Total	5.00E-02	50 ppb	NO	YES
Silver, Ag	10 U Total	1.83E-01	183 ppb	NO	YES
Sodium	7,920 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Strontium, Sr	109 Total	2.19E+01	21,900 ppb	NO	NO
Tetrachloroethylene	0.5 U	5.00E-03	5 ppb	NO	YES
Thallium, Tl	2.3 U Total	2.00E-03	2 ppb	NO	NO
Tin, Sn	1.7 U Total	2.19E+01	21,900 ppb	NO	NO
Toluene	0.5U	1.00E+00	1000 ppb	NO	YES
Trichloroethylene	0.5U	5.00E-03	5 ppb	NO	YES
Vanadium, V	0.6U Total	2.56E-01	256 ppb	NO	NO
Vinyl chloride	0.5U	2.00E-03	2 ppb	NO	YES
Xylenes	0.5U	1.00E+01	10,000 ppb	NO	YES
Zinc, Zn	14.1 Total	1.10E+01	11,000 ppb	NO	NO

SUMP 157
Sample Report Date 2/25/98
Summarized Tuesday March 24 1998
Ted A. Hopkins

Sample from rinsate from B123, Sump 158
SUMP 158
Sample # 98A0996-003 Metals 98A0996-003.018

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
1,1 Dichloroethylene	0.5U	7.00E-03	7 ppb	NO	YES
1,1,2-Trichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
1-1-1-Trichloroethane	0.5U	2.00E-01	200 ppb	NO	YES
1-2-Dichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
2-Butanone (Methyl ethyl ketone)	2 U	2.47E+00	2470 ppb	NO	YES
Acetone	2 U	3.65E+00	3650 ppb	NO	YES
Aluminum, Al	135Total	1.06E+02	106,000 ppb	NO	NO
Antimony, Sb	1.4 U Total	6.00E-03	6 ppb	NO	NO
Arsenic, As	1.6 U Total	5.00E-02	50 ppb	NO	YES
Barium, Ba	20.6 Total	2.00E+00	2,000 ppb	NO	YES
Benzene	0.5 U	5.00E-03	5 ppb	NO	YES
Beryllium, Be	0.2 U Total	4.00E-03	4 ppb	NO	NO
Bromodichloromethane	6 Baseline Contaminant	1.00E-01	100 ppb	NO	NO
Cadmium, Cd	0.4 U Total	5.00E-03	5 ppb	NO	YES
Carbon disulfide	2.0 U	2.76E-02	27.6 ppb	NO	YES
Carbon tetrachloride	0.5U	5.00E-03	5 ppb	NO	YES
Chlorobenzene	0.5U	1.00E-01	100 ppb	NO	YES
Chloroform	44 Baseline contaminant	1.00E-01	100 ppb	NO	YES
Chromium, Cr	1.1 Total	1.00E-01	100 ppb	NO	YES
Cobalt, Co	0.50 U Total	2.19E+00	2,190 ppb	NO	NO
Copper, Cu	0.70 U Total	1.30E+00	1,300 ppb	NO	NO
Dibromochloromethane	0.7				
Ethylbenzene	0.5U	7.00E-01	700 ppb	NO	YES
Iron, Fe	79.3 Total	NA, not on Tier 2 Table	NA	NO	NO

1

SUMP 158
Sample Report Date 2/25/98
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA *Closure Plan for RCRA Unit 40?*
Lead, Pb	2.4 Total	Not found in RFCA Tier 2 Table	NA	The MCL for lead is 15 ppb.	YES? Under the Safe Drinking Water Act, 15 ppb is the MCL for lead.
Lithium, Li	5.6 Total	7.30E+01	73,000 ppb	NO	NO
Magnesium, Mg	3030 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Manganese, Mn	1.6 Total	1.83E-01	183 ppb	NO	NO
Mercury, Hg	0.10 U Total	2.00E-03	2 ppb	NO	YES
Methylene chloride	0.5U	5.00E-03	5 ppb	NO	YES
Molybdenum, Mo	20.5 Total	1.83E-01	183 ppb	NO	NO
Nickel, Ni	0.60 U Total	1.00E-01	100 ppb	NO	NO
Potassium, K	1,030 Total	Not found in the RFCA Tier 2 Table	NA	NO	NO
Pyridine	70 U	Not on Tier 2 List	NA	Not on Tier 2 list.	YES
Selenium, Se	1.8 U Total	5.00E-02	50 ppb	NO	YES
Silver, Ag	10 U Total	1.83E-01	183 ppb	NO	YES
Sodium	7,490 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Strontium, Sr	107 Total	2.19E+01	21,900 ppb	NO	NO
Tetrachloroethylene	0.5 U	5.00E-03	5 ppb	NO	YES
Thallium, Tl	2.3 U Total	2.00E-03	2 ppb	NO	NO
Tin, Sn	4.7 Total	2.19E+01	21,900 ppb	NO	NO
Toluene	0.8	1.00E+00	1000 ppb	NO	YES
Trichloroethylene	0.5U	5.00E-03	5 ppb	NO	YES
Vanadium, V	0.6U Total	2.56E-01	256 ppb	NO	NO
Vinyl chloride	0.5U	2.00E-03	2 ppb	NO	YES
Xylenes	0.7	1.00E+01	10,000 ppb	NO	YES
Zinc, Zn	4.3 Total	1.10E+01	11,000 ppb	NO	NO

SUMP 158
Sample Report Date 2/25/98
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

APO SAMPLE RECEIPT

This sample receipt is supplied to waste generators as notification of sample collection. Inquiries into the status of this sample may be directed to the Analytical Projects Office (APO) by calling 966-2403, 966-7789, or 966-3771. The APO references samples by the following identification numbers:

RIN: 98A0996
APO Event: 98A0996-001
Duplicate ID:
Issue Date: 02/03/98

Waste Stream ID: 123-0-0
Customer Sample ID: SUMP 156
Field Blank ID:
Equipment Blank ID:
Trip Blank ID:

Sample Description: FINAL RCRA RINSATE FROM 123
Other Id:
Sample Location: BLDG 123, ROOM 156

Baseline Print
98A0996-004.
004-
RECRU
004-
004-
004-
004

THU 559
ECRU
VOKs
RECRU
RECRU

Analyses Requested:	Bottle ID
AQUEOUS RADSCREEN - DOT	98A0996-001.001
GROSS ALPHA/BETA - NO RAD ADDED (WASTE)	98A0996-001.001
FINGERPRINT (559)	98A0996-001.002
SW-846 8260 (Water, Aqueous Waste)	98A0996-001.003
SW-846 8260 (Water, Aqueous Waste)	98A0996-001.004
SW-846 8270B (TCLP Extracts)	98A0996-001.005
TOTAL METALS SW-846 (HG)	98A0996-001.006
AQUEOUS RADSCREEN - DOT	98A0996-002.007
GROSS ALPHA/BETA - NO RAD ADDED (WASTE)	98A0996-002.007
FINGERPRINT (559)	98A0996-002.008
SW-846 8260 (Water, Aqueous Waste)	98A0996-002.009
SW-846 8260 (Water, Aqueous Waste)	98A0996-002.010
SW-846 8270B (TCLP Extracts)	98A0996-002.011
TOTAL METALS SW-846 (HG)	98A0996-002.012
AQUEOUS RADSCREEN - DOT	98A0996-003.013
GROSS ALPHA/BETA - NO RAD ADDED (WASTE)	98A0996-003.013
FINGERPRINT (559)	98A0996-003.014
SW-846 8260 (Water, Aqueous Waste)	98A0996-003.015
SW-846 8260 (Water, Aqueous Waste)	98A0996-003.016
SW-846 8270B (TCLP Extracts)	98A0996-003.017
TOTAL METALS SW-846 (HG)	98A0996-003.018

		Phone	Pager
Date Sampled:			
Process Contact:	M. AYCOCK	5309	7508
Alternate Contact:	P. VALENTINELLI	6047	

Returning Excess Sample Material

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulations (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposed will not be returned.

INTER-DEPARTMENT DELIVERY:

Deliver To:
Building:
Organization:

Date: 02/03/98
Page: 4

Best Available Copy

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80402
(303) 966-6860

RIN: 98A0996
Report Date: 02/25/98

Sample and Duplicate Analysis Results

Customer Sample ID	Lab Sample ID	Gross Alpha Activity	Gross Alpha Unc. (2s)	Gross Alpha MDA	Gross Beta Activity	Gross Beta Unc. (2s)	Gross Beta MDA	Units	QC Batch
98A0996-001.001	98020069-01	0.7	0.6	1.3	0.7	0.9	2.2	pCi/l	98AB026
98A0996-002.007	98020069-02	0.8	0.6	1.3	1.5	0.9	2.1	pCi/l	98AB026
98A0996-003.013	98020069-03	0.6	0.6	1.4	1.6	0.9	2.1	pCi/l	98AB026
98A0996-004.019	98020069-04	0.9	0.4	1.4	1.3	0.7	2.2	pCi/l	98AB026
98A0996-004.019	98020069-08 D	0.7	0.6	1.4	0.5	1.0	2.2	pCi/l	98AB026

Preparation Blank Results

QC Batch	Lab Sample ID	Gross Alpha Activity	Gross Alpha Unc. (2s)	Gross Alpha MDA	Gross Beta Activity	Gross Beta Unc. (2s)	Gross Beta MDA	Units
98AB026	98020069-09	-0.1	0.5	1.2	0.6	0.9	2.2	pCi/l

LCS Results

QC Batch	Lab Sample ID	Gross Alpha Activity	Gross Alpha Unc. (2s)	Gross Alpha MDA	Gross Beta Activity	Gross Beta Unc. (2s)	Gross Beta MDA	Units	SRM
98AB026	98020069-10	24.4	3.5	5.1	24.6	3.7	6.9	pCi/l	8AB_CTRL10

0011

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80402
(303) 966-6860

RIN: 98A0996
Report Date: 02/25/98

Method Summary

Gross alpha and gross beta activities are measured by evaporating an aliquot of the prepared sample onto a counting planchet and counting the alpha and beta activities in a low background, thin-windowed, gas flow proportional counter. Organics or combustible solids are ashed, the residue dissolved in acid, and the solution or an aliquot of the solution is evaporated onto a counting planchet. Aqueous samples are concentrated and then evaporated onto a counting planchet. Analysis of aqueous samples and prepared non-aqueous samples is described in detail in Rocky Flats Procedure, L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"*. Preparation of oils, solvents and other combustible organics is described in L-6194, *"Preparation of Oils and Solvents for Analysis of Gross Alpha and Gross Beta Activity"*. The counting procedure is described in procedure L-6295, *"Operation of the Tennelec LB4100 Gas Proportional Counters"*.

The detector counting efficiency and self-absorption effects of the salt residue on the planchet are determined from calibration curves which are generated by counting several planchets prepared with a known amount of alpha or beta activity and increasing amounts of salt (0 to 100 mg). Americium-241 is used as the spike for the alpha curves and a solution of Sr-90, Y-90 is used for the beta curves. These standards are prepared from certified reference material which is traceable to the National Institute of Standards Technology (NIST).

The theoretical minimum detectable activity (MDA) for the analysis is based on the detector background, detector efficiency and self-absorption effects, count time and quantity of sample analyzed. The MDA for each analysis is calculated and is also reported. If the reported result is based on the average of two or more counts, the average MDA is reported.

Quality Control Summary

A sample batch consists of eleven or fewer samples, a duplicate of one of the samples, an alpha and a beta laboratory control sample, and a preparation blank. Each set of samples forms a "QC Batch" and is assigned a QC batch number. A sample can be traced back to its corresponding quality control samples through the QC Batch number. The preparation blank (PB), an aliquot of deionized, distilled water, is prepared and analyzed with the samples to confirm that the samples were not contaminated during the analysis. The activities reported for samples and standards were not corrected for preparation blank activity. The alpha and beta laboratory control samples are aqueous standards of ^{241}Am and ^{90}Sr, respectively. The SRM standards used to prepared these standards are traceable to NIST. The duplicate, designated as the sample ID followed by a "D", is a second aliquot of one of the samples in the QC Batch which is carried through the procedure as a separate sample.

The instrument QC includes determining instrument backgrounds weekly and counting an instrument check source daily on the Tennelec LB4100 multidetector gas proportional counters. The instrument backgrounds are based on the average of at least five, and normally ten or more, 4 hour counts. The instrument check sources are counted daily to verify that the efficiencies of the detectors have not changed. A summary of the instrument backgrounds is included in the instrument raw data section of this report. The daily check source information is available in the supporting documentation package.

Narrative

These samples were submitted for radscreen analysis and analysis of gross alpha/gross beta activity for No-Rad-Added assessment. The radscreen analyses were done according to procedure L-6278, *"Sample Preparation for Radiological Screening by Gas Proportional Counting"* in QC batch 98RS038. The gross alpha/gross beta analyses were done using procedure L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"* incorporating the quality control requirements of procedure L-6194, *"Preparation of Oils and Solvents for Analysis of Gross Alpha and Gross Beta Activity"* in order to comply with the No-Rad-Added program quality requirements. The gross alpha/gross beta analyses were done in QC batch 98AB026. This batch also included a sample from RIN 98A0997. The first time the planchets were counted, the alpha counts of the two planchets prepared for sample 98020069-04 were statistically different (2σ). These two planchets were recounted and again the alpha counts of the two planchets were statistically different. However, planchet "A" initially counted higher than "B" and in the recount, the "A" planchet counted lower than the "B" planchet. All four alpha activities measured for this sample are less than the MDAs for the measurements and are equivalent when all sources of measurement uncertainty are propagated. The average activities and MDAs and propagated uncertainties of the four measurements (two counts of two planchets) are reported for sample 98020069-04. Sample 98020069-04 was also used for the lab duplicate (98020069-08). The average alpha activity for sample 98020069-04 is in good agreement with the lab duplicate alpha activity. There were no other problems noted in these analyses and all QC data for the batch are acceptable.

0009

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Recra LabNet - Chicago
METHOD 8260 VOLATILES

RFW Batch Number: 98026363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Report Date: 02/24/98 09:09 Page: 1a

39

		Sump 156				Sump 157		Sump 158				Baseline
Sample Information	Cust ID:	98A0996-001. 003		98A0996-001. 003		98A0996-002. 009		98A0996-003. 015		98A0996-003. 015		98A0996-004. 021	
	RFW#:	001		001 DL		005		009		009 DL		013	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1		5		1		1		5		1	
	Units:	UG/L		UG/L		UG/L		UG/L		UG/L		UG/L	
Surrogate Recovery	4-Bromofluorobenzene	103	%	110	%	102	%	105	%	109	%	103	%
	Toluene-d8	104	%	105	%	106	%	104	%	106	%	103	%
	1,2-Dichloroethane-d4	99	%	110	%	96	%	105	%	109	%	103	%
Dichlorodifluoromethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Chloromethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Vinyl chloride		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Bromomethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Chloroethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Trichlorofluoromethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
1,1-Dichloroethene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Methylene Chloride		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
trans-1,2-Dichloroethene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
1,1-Dichloroethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
2,2-Dichloropropane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
cis-1,2-Dichloroethene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Bromochloromethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Chloroform			E	38		26			E	44			E
1,1,1-Trichloroethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
1,1-Dichloropropene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Carbon Tetrachloride		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Benzene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
1,2-Dichloroethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Trichloroethene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
1,2-Dichloropropane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Dibromomethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Bromodichloromethane		5		NA		5		6		NA		6	
Toluene		0.5	U	NA		0.5	U	0.8		NA		0.5	U
1,1,2-Trichloroethane		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Tetrachloroethene		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9802G363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Page: 1b

RM 156

Cust ID:	98A0996-001. 003		98A0996-001. 003	98A0996-002. 009		98A0996-003. 015		98A0996-003. 015	98A0996-004. 021	
RFW#:	001		001 DL	005		009		009 DL	013	
1,3-Dichloropropane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Dibromochloromethane	0.5	U	NA	0.7		0.5	U	NA	0.5	U
1,2-Dibromoethane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Chlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,1,1,2-Tetrachloroethane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Ethylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Styrene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Bromoform	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Isopropylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Bromobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2,3-Trichloropropane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
n-Propylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
2-Chlorotoluene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
4-Chlorotoluene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,3,5-Trimethylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
tert-Butylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2,4-Trimethylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
sec-Butylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,3-Dichlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
p-Isopropyltoluene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,4-Dichlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2-Dichlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
n-Butylbenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2-Dibromo-3-chloropropane	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2,4-Trichlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Hexachlorobutadiene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Naphthalene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
1,2,3-Trichlorobenzene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
cis-1,3-Dichloropropene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
trans-1,3-Dichloropropene	0.5	U	NA	0.5	U	0.5	U	NA	0.5	U
Acetone	2	U	NA	2	U	2	U	NA	2	U
2-Butanone	2	U	NA	2	U	2	U	NA	2	U
Carbon Disulfide	2	U	NA	2	U	2	U	NA	2	U
4-Methyl-2-pentanone	2	U	NA	2	U	2	U	NA	2	U
2-Hexanone	2	U	NA	2	U	2	U	NA	2	U

*= Outside of EPA CLP QC limits.

0.40

41

C

RM 156

RFW Batch Number: 98026363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Page: 1c

Cust ID:	98A0996-001. 003	98A0996-001. 003	98A0996-002. 009	98A0996-003. 015	98A0996-003. 015	98A0996-004. 021
RFW#:	001	001 DL	005	009	009 DL	013
Trichlorotrifluoroethane	2 U	NA	2 U	2 U	NA	2 U
Xylene (total)	0.5 U	NA	0.5 U	0.7	NA	0.5 U

*= Outside of EPA CLP QC limits.

Recra LabNet - Chicago
METHOD 8260 VOLATILES

RFW Batch Number: 9802G363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Report Date: 02/24/98 09:09 Page: 2a

	Cust ID:	98A0996-004. 021 (Baseline)		VBLKDA		VBLKDA BS		VBLKCQ		VBLKCQ BS	
Sample Information	RFW#:	013 DL		98GVF055-MB1		98GVF055-MB1		98GVF057-MB1		98GVF057-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER	
	D.F.:	5		1		1		1		1	
	Units:	UG/L		UG/L		UG/L		UG/L		UG/L	
Surrogate Recovery	4-Bromofluorobenzene	104	%	104	%	103	%	104	%	110	%
	Toluene-d8	107	%	107	%	101	%	103	%	109	%
	1,2-Dichloroethane-d4	97	%	98	%	98	%	98	%	103	%
Dichlorodifluoromethane		NA		0.5	U	58	%	0.5	U	68	%
Chloromethane		NA		0.5	U	101	%	0.5	U	108	%
Vinyl chloride		NA		0.5	U	96	%	0.5	U	103	%
Bromomethane		NA		0.5	U	74	%	0.5	U	80	%
Chloroethane		NA		0.5	U	99	%	0.5	U	109	%
Trichlorofluoromethane		NA		0.5	U	61	%	0.5	U	64	%
1,1-Dichloroethene		NA		0.5	U	72	%	0.5	U	69	%
Methylene Chloride		NA		0.5	U	75	%	0.5	U	88	%
trans-1,2-Dichloroethene		NA		0.5	U	80	%	0.5	U	86	%
1,1-Dichloroethane		NA		0.5	U	82	%	0.5	U	87	%
2,2-Dichloropropane		NA		0.5	U	91	%	0.5	U	89	%
cis-1,2-Dichloroethene		NA		0.5	U	92	%	0.5	U	98	%
Bromochloromethane		NA		0.5	U	94	%	0.5	U	102	%
Chloroform		47		0.5	U	85	%	0.5	U	89	%
1,1,1-Trichloroethane		NA		0.5	U	78	%	0.5	U	78	%
1,1-Dichloropropene		NA		0.5	U	86	%	0.5	U	84	%
Carbon Tetrachloride		NA		0.5	U	74 *	%	0.5	U	73 *	%
Benzene		NA		0.5	U	85	%	0.5	U	90	%
1,2-Dichloroethane		NA		0.5	U	81	%	0.5	U	85	%
Trichloroethene		NA		0.5	U	85	%	0.5	U	90	%
1,2-Dichloropropane		NA		0.5	U	92	%	0.5	U	98	%
Dibromomethane		NA		0.5	U	90	%	0.5	U	99	%
Bromodichloromethane		NA		0.5	U	84	%	0.5	U	90	%
Toluene		NA		0.5	U	87	%	0.5	U	92	%
1,1,2-Trichloroethane		NA		0.5	U	91	%	0.5	U	98	%
Tetrachloroethene		NA		0.5	U	85	%	0.5	U	84	%

*= Outside of EPA CLP QC limits.

42 QC

RFW Batch Number: 9802G363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Page: 2b

Cust ID:	98A0996-004	VBLKDA		VBLKDA BS		VBLKCQ		VBLKCQ BS	
RFW#:	021 013 DL	98GVF055-MB1		98GVF055-MB1		98GVF057-MB1		98GVF057-MB1	
1,3-Dichloropropane	NA	0.5	U	96	%	0.5	U	103	%
Dibromochloromethane	NA	0.5	U	88	%	0.5	U	92	%
1,2-Dibromoethane	NA	0.5	U	93	%	0.5	U	100	%
Chlorobenzene	NA	0.5	U	89	%	0.5	U	94	%
1,1,1,2-Tetrachloroethane	NA	0.5	U	86	%	0.5	U	90	%
Ethylbenzene	NA	0.5	U	87	%	0.5	U	90	%
Styrene	NA	0.5	U	92	%	0.5	U	97	%
Bromoform	NA	0.5	U	92	%	0.5	U	98	%
Isopropylbenzene	NA	0.5	U	84	%	0.5	U	86	%
Bromobenzene	NA	0.5	U	89	%	0.5	U	94	%
1,1,2,2-Tetrachloroethane	NA	0.5	U	94	%	0.5	U	102	%
1,2,3-Trichloropropane	NA	0.5	U	92	%	0.5	U	95	%
n-Propylbenzene	NA	0.5	U	90	%	0.5	U	87	%
2-Chlorotoluene	NA	0.5	U	92	%	0.5	U	91	%
4-Chlorotoluene	NA	0.5	U	88	%	0.5	U	88	%
1,3,5-Trimethylbenzene	NA	0.5	U	85	%	0.5	U	84	%
tert-Butylbenzene	NA	0.5	U	87	%	0.5	U	85	%
1,2,4-Trimethylbenzene	NA	0.5	U	87	%	0.5	U	88	%
sec-Butylbenzene	NA	0.5	U	86	%	0.5	U	83	%
1,3-Dichlorobenzene	NA	0.5	U	93	%	0.5	U	96	%
p-Isopropyltoluene	NA	0.5	U	84	%	0.5	U	83	%
1,4-Dichlorobenzene	NA	0.5	U	96	%	0.5	U	97	%
1,2-Dichlorobenzene	NA	0.5	U	89	%	0.5	U	96	%
n-Butylbenzene	NA	0.5	U	89	%	0.5	U	86	%
1,2-Dibromo-3-chloropropane	NA	0.5	U	100	%	0.5	U	108	%
1,2,4-Trichlorobenzene	NA	0.5	U	96	%	0.5	U	101	%
Hexachlorobutadiene	NA	0.5	U	85	%	0.5	U	80	%
Naphthalene	NA	0.5	U	101	%	0.5	U	108	%
1,2,3-Trichlorobenzene	NA	0.5	U	92	%	0.5	U	101	%
cis-1,3-Dichloropropene	NA	0.5	U	83	%	0.5	U	93	%
trans-1,3-Dichloropropene	NA	0.5	U	89	%	0.5	U	92	%
Acetone	NA	2	U	108	%	2	U	105	%
2-Butanone	NA	2	U	128	%	2	U	106	%
Carbon Disulfide	NA	2	U	65	%	2	U	64	%
4-Methyl-2-pentanone	NA	2	U	113	%	2	U	110	%
2-Hexanone	NA	2	U	124	%	2	U	116	%

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9802G363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9 Page: 2c

	Cust ID:	98A0996-004.	VBLKDA		VBLKDA BS		VBLKCQ		VBLKCQ BS	
		021								
	RFW#:	013 DL	98GVF055-MB1		98GVF055-MB1		98GVF057-MB1		98GVF057-MB1	
Trichlorotrifluoroethane		NA	2	U	2	U	2	U	2	U
Xylene (total)		NA	0.5	U	92	%	0.5	U	96	%

*= Outside of EPA CLP QC limits.

44

03

Recra LabNet - Chicago
SEMIVOLATILES BY GC/MS, TCLP LEACHATE

Report Date: 03/04/98 14:02
Page: 1a

RFW Batch Number: 9802G363 Client: ICF Kaiser-98A0996 Work Order: 11830-001-001-9

		Sump 156				Sump 157		Sump 158		Baseline			
Sample Information	Cust ID:	98A0996-001. 005		98A0996-001. 005		98A0996-002. 011		98A0996-003. 017		98A0996-004. 023		SBLKHX	
	RFW#:	003		003 MS		007		011		015		98GB0056-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1		1		1		1		1		1	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	2-Fluorophenol	71	%	76	%	72	%	76	%	57	%	60	%
	Phenol-d5	78	%	92	%	77	%	73	%	61	%	64	%
	Nitrobenzene-d5	85	%	101	%	90	%	96	%	72	%	72	%
	2-Fluorobiphenyl	82	%	99	%	87	%	89	%	75	%	68	%
	2,4,6-Tribromophenol	62	%	75	%	63	%	61	%	56	%	51	%
	p-Terphenyl-d14	90	%	101	%	85	%	90	%	94	%	84	%
			f]		f]		f]		f]		f]		f]
Pyridine		70	U	81	%	70	U	70	U	70	U	7	U
1,4-Dichlorobenzene		50	U	80	%	50	U	50	U	50	U	5	U
o-Cresol		60	U	90	%	60	U	60	U	60	U	6	U
meta & para-Cresol		30	U	89	%	30	U	30	U	30	U	3	U
Hexachloroethane		70	U	89	%	70	U	70	U	70	U	7	U
Nitrobenzene		40	U	96	%	40	U	40	U	40	U	4	U
Hexachlorobutadiene		80	U	70	%	80	U	80	U	80	U	8	U
2,4,6-Trichlorophenol		30	U	94	%	30	U	30	U	30	U	3	U
2,4,5-Trichlorophenol		40	U	85	%	40	U	40	U	40	U	4	U
2,4-Dinitrotoluene		20	U	114	%	20	U	20	U	20	U	2	U
Hexachlorobenzene		30	U	78	%	30	U	30	U	30	U	3	U
Pentachlorophenol		60	U	89	%	60	U	60	U	60	U	6	U

*= Outside of EPA CLP QC limits.

Recra LabNet - Chicago
SEMIVOLATILES BY GC/MS, TCLP LEACHATE

Report Date: 03/04/98 14:02
Page: 2a

RFW Batch Number: 9802G363
Client: ICF Kaiser-98A0996
Work Order: 11830-001-001-9

Sample Information	Cust ID:	SBLKHX BS		SBLKHY		SBLKHZ		SBLKIA	
	RFW#:	98GB0056-MB1		98GB0056-TC1		98GB0056-TC2		98GB0056-TC3	
	Matrix:	WATER		WATER		WATER		WATER	
	D.F.:	1		1		1		1	
	Units:	ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	2-Fluorophenol	85	%	70	%	68	%	76	%
	Phenol-d5	99 *	%	75	%	74	%	82	%
	Nitrobenzene-d5	100	%	86	%	77	%	88	%
	2-Fluorobiphenyl	96	%	86	%	76	%	89	%
	2,4,6-Tribromophenol	71	%	56	%	60	%	66	%
	p-Terphenyl-d14	104	%	102	%	97	%	102	%
			fl		fl		fl		fl
Pyridine		56	%	70	U	70	U	70	U
1,4-Dichlorobenzene		77	%	50	U	50	U	50	U
o-Cresol		89	%	60	U	60	U	60	U
meta & para-Cresol		90	%	30	U	30	U	30	U
Hexachloroethane		86	%	70	U	70	U	70	U
Nitrobenzene		95	%	40	U	40	U	40	U
Hexachlorobutadiene		67	%	80	U	80	U	80	U
2,4,6-Trichlorophenol		88	%	30	U	30	U	30	U
2,4,5-Trichlorophenol		89	%	40	U	40	U	40	U
2,4-Dinitrotoluene		106	%	20	U	20	U	20	U
Hexachlorobenzene		74	%	30	U	30	U	30	U
Pentachlorophenol		85	%	60	U	60	U	60	U

fl fl

*= Outside of EPA CLP QC limits.

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 02/25/98

CLIENT: ICF Kaiser-98A0996 RECRA LOT #: 9802G363
WORK ORDER: 11830-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-004	98A0996-001.006	Silver, Total	10.0	u	UG/L	10.0
	Sump 156	Aluminum, Total	132		UG/L	13.1
		Arsenic, Total	1.6	u	UG/L	1.6
		Barium, Total	21.9		UG/L	0.20
		Beryllium, Total	0.20	u	UG/L	0.20
		Calcium, Total	13500		UG/L	7.6
		Cadmium, Total	0.40	u	UG/L	0.40
		Cobalt, Total	0.50	u	UG/L	0.50
		Chromium, Total	0.51		UG/L	0.40
		Copper, Total	0.70	u	UG/L	0.70
		Iron, Total	59.7		UG/L	16.9
		Mercury, Total	0.10	u	UG/L	0.10
		Potassium, Total	1000		UG/L	7.4
		Lithium, Total	4.7		UG/L	1.3
		Magnesium, Total	3200		UG/L	7.6
		Manganese, Total	2.0		UG/L	0.50
		Molybdenum, Total	21.5		UG/L	0.50
		Sodium, Total	7510		UG/L	177
		Nickel, Total	0.60	u	UG/L	0.60
		Lead, Total	4.0		UG/L	1.2
		Antimony, Total	3.1		UG/L	1.4
		Selenium, Total	1.8	u	UG/L	1.8
		Tin, Total	10.4		UG/L	1.7
		Strontium, Total	114		UG/L	0.20
		Thallium, Total	2.3	u	UG/L	2.3
		Vanadium, Total	0.60	u	UG/L	0.60
		Zinc, Total	9.6		UG/L	0.60

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 02/25/98

CLIENT: ICF Kaiser-98A0996 —
WORK ORDER: 11830-001-001-9999-00

RECRA LOT #: 9802G363

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-008	98A0996-002.012	Silver, Total	10.0 u	UG/L	10.0
	Sump 157	Aluminum, Total	138	UG/L	13.1
		Arsenic, Total	1.6 u	UG/L	1.6
		Barium, Total	21.9	UG/L	0.20
		Beryllium, Total	0.20 u	UG/L	0.20
		Calcium, Total	13200	UG/L	7.6
		Cadmium, Total	3.1	UG/L	0.40
		Cobalt, Total	0.50 u	UG/L	0.50
		Chromium, Total	13.2	UG/L	0.40
		Copper, Total	4.8	UG/L	0.70
		Iron, Total	152	UG/L	16.9
		Mercury, Total	0.10 u	UG/L	0.10
		Potassium, Total	1010	UG/L	7.4
		Lithium, Total	4.2	UG/L	1.3
		Magnesium, Total	3090	UG/L	7.6
		Manganese, Total	19.0	UG/L	0.50
		Molybdenum, Total	20.9	UG/L	0.50
		Sodium, Total	7920	UG/L	177
		Nickel, Total	111	UG/L	0.60
		Lead, Total	4.1	UG/L	1.2
		Antimony, Total	1.4 u	UG/L	1.4
		Selenium, Total	1.8 u	UG/L	1.8
		Tin, Total	1.7 u	UG/L	1.7
		Strontium, Total	109	UG/L	0.20
		Thallium, Total	2.3 u	UG/L	2.3
		Vanadium, Total	0.60 u	UG/L	0.60
		Zinc, Total	14.1	UG/L	0.60

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 02/25/98

CLIENT: ICF Kaiser-98A0996 —
WORK ORDER: 11830-001-001-9999-00

RECRA LOT #: 9802G363

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-012	98A0996-003.018	Silver, Total	10.0	u	UG/L	10.0
	Sump 158	Aluminum, Total	135		UG/L	13.1
		Arsenic, Total	1.6	u	UG/L	1.6
		Barium, Total	20.6		UG/L	0.20
		Beryllium, Total	0.20	u	UG/L	0.20
		Calcium, Total	12600		UG/L	7.6
		Cadmium, Total	0.40	u	UG/L	0.40
		Cobalt, Total	0.50	u	UG/L	0.50
		Chromium, Total	1.1		UG/L	0.40
		Copper, Total	0.70	u	UG/L	0.70
		Iron, Total	79.3		UG/L	16.9
		Mercury, Total	0.10	u	UG/L	0.10
		Potassium, Total	1030		UG/L	7.4
		Lithium, Total	5.6		UG/L	1.3
		Magnesium, Total	3030		UG/L	7.6
		Manganese, Total	1.6		UG/L	0.50
		Molybdenum, Total	20.5		UG/L	0.50
		Sodium, Total	7490		UG/L	177
		Nickel, Total	0.60	u	UG/L	0.60
		Lead, Total	2.4		UG/L	1.2
		Antimony, Total	1.4	u	UG/L	1.4
		Selenium, Total	1.8	u	UG/L	1.8
		Tin, Total	4.7		UG/L	1.7
		Strontium, Total	107		UG/L	0.20
		Thallium, Total	2.3	u	UG/L	2.3
		Vanadium, Total	0.60	u	UG/L	0.60
		Zinc, Total	4.3		UG/L	0.65

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 02/25/98

CLIENT: ICF Kaiser-98A0996 —
WORK ORDER: 11830-001-001-9999-00

RECRA LOT #: 9802G363

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-016	98A0996-004.024	Silver, Total	10.0	u	UG/L	10.0
	Baseline	Aluminum, Total	137		UG/L	13.1
		Arsenic, Total	1.6	u	UG/L	1.6
		Barium, Total	22.2		UG/L	0.20
		Beryllium, Total	0.20	u	UG/L	0.20
		Calcium, Total	13200		UG/L	7.6
		Cadmium, Total	0.40	u	UG/L	0.40
		Cobalt, Total	0.50	u	UG/L	0.50
		Chromium, Total	0.41		UG/L	0.40
		Copper, Total	0.70	u	UG/L	0.70
		Iron, Total	38.5		UG/L	16.9
		Mercury, Total	0.10	u	UG/L	0.10
		Potassium, Total	972		UG/L	7.4
		Lithium, Total	4.9		UG/L	1.3
		Magnesium, Total	3180		UG/L	7.6
		Manganese, Total	1.3		UG/L	0.50
		Molybdenum, Total	21.6		UG/L	0.50
		Sodium, Total	7290		UG/L	177
		Nickel, Total	0.60	u	UG/L	0.60
		Lead, Total	2.1		UG/L	1.2
		Antimony, Total	2.2		UG/L	1.4
		Selenium, Total	2.2		UG/L	1.8
		Tin, Total	1.7	u	UG/L	1.7
		Strontium, Total	112		UG/L	0.20
		Thallium, Total	2.3	u	UG/L	2.3
		Vanadium, Total	0.60	u	UG/L	0.60
		Zinc, Total	6.4		UG/L	0.60

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name:	559 Radioanalytical Laboratories	RF Sample ID:	98A0996-001.002
Lab Code:	559 RIL	Lab Sample ID:	98A0996-001.002
		RIN:	98A0996-001.002

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 6/19/1997.

Case Narrative:

On February 9, 1998 this Sump sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis..

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories   RF Sample ID: 98A0996-001.002
Lab Code: 559 RIL   Lab Sample ID: 98A0996-001.002
Date of Analysis: Feb 10 1998   RIN: 98A0996-001.002

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, transparent, colorless, non-viscous liquid.			N A
	Water Test	Positive			N A
10-29-7	pH	5			S. U.
	Specific Gravity	0.9963			*1
	Miscible with	Water			N A
	Reactivity with Water	No			N A
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval:

Peer Review:

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name:	559 Radioanalytical Laboratories	RF Sample ID:	98A0996-002.008
Lab Code:	559 RIL	Lab Sample ID:	98A0996-002.008
		RIN:	98A0996-002.008

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 8/19/1997.

Case Narrative:

On February 9, 1998 this Sump sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis.

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories   RF Sample ID: 98A0996-002.008

Lab Code: 559 RIL   Lab Sample ID: 98A0996-002.008

Date of Analysis: Feb 10 1998   RIN: 98A0996-002.008

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, transparent, colorless, non-viscous liquid.			N A
	Water Test	Positive			N A
10-29-7	pH	5			S. U.
	Specific Gravity	0.9999			*1
	Miscible with	Water			N A
	Reactivity with Water	No			N A
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval: Roger A. Henderson

Peer Review: Jon R. Weiss

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name: 559 Radioanalytical Laboratories		RF Sample ID:	98A0996-004.020
Lab Code: 559 RIL		Lab Sample ID:	98A0996-004.020
		RIN:	98A0996-004.020

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 6/19/1997.

Case Narrative:

On February 9, 1998 this Sump sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis.

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories | RF Sample ID: 98A0996-004.020

Lab Code: 559 RIL | Lab Sample ID: 98A0996-004.020

Date of Analysis: Feb 10 1998 | RIN: 98A0996-004.020

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, transparent, colorless, non-viscous liquid.			N A
	Water Test	Positive			N A
10-29-7	pH	5			S. U.
	Specific Gravity	1.0044			*1
	Miscible with	Water			N A
	Reactivity with Water	No			N A
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval: Roger C. Anderson

Peer Review: Jon R. Weiss

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name: 559 Radioanalytical Laboratories		RF Sample ID:	98A0996-003.014
Lab Code: 559 RIL		Lab Sample ID:	98A0996-003.014
		RIN:	98A0996-003.014

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 6/19/1997.

Case Narrative:

On February 9, 1998 this Sump sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis.

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories — RF Sample ID: 98A0996-003.014

Lab Code: 559 RIL — Lab Sample ID: 98A0996-003.014

Date of Analysis: Feb 10 1998 — RIN: 98A0996-003.014

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, transparent, colorless, non-viscous liquid.			NA
	Water Test	Positive			NA
10-29-7	pH	5			S. U.
	Specific Gravity	0.9990			*1
	Miscible with	Water			NA
	Reactivity with Water	No			NA
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval: Roger A. Henderson

Peer Review: Jon R. Weiss

Appendix C - Analytical Results for the Sump in Room 125

Sample from rinsate from B123, Sump in Room #125.
125 SUMP
Sample # 98A1028

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
1,1 Dichloroethylene	0.5U	7.00E-03	7 ppb	NO	YES
1,1,2-Trichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
1-1-1-Trichloroethane	0.5U	2.00E-01	200 ppb	NO	YES
1-2-Dichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
2-Butanone (Methyl ethyl ketone)	2 U	2.47E+00	2470 ppb	NO	YES
Acetone	27	3.65E+00	3650 ppb	NO	YES
Aluminum, Al	100 U	1.06E+02	106,000 ppb	NO	NO
Antimony, Sb	50 U	6.00E-03	6 ppb	NO	NO
Arsenic, As	50 U	5.00E-02	50 ppb	NO	YES
Barium, Ba	25	2.00E+00	2,000 ppb	NO	YES
Benzene	0.5 U	5.00E-03	5 ppb	NO	YES
Beryllium, Be	2.5 U	4.00E-03	4 ppb	NO	NO
Bromodichloromethane	7	1.00E-01	100 ppb	NO	NO
Cadmium, Cd	5 U	5.00E-03	5 ppb	NO	YES
Carbon disulfide	2.0 U	2.76E-02	27.6 ppb	NO	YES
Carbon tetrachloride	0.5U	5.00E-03	5 ppb	NO	YES
Chlorobenzene	0.5U	1.00E-01	100 ppb	NO	YES
Chloroform	61	1.00E-01	100 ppb	NO	YES
Chromium, Cr	10 U	1.00E-01	100 ppb	NO	YES
Cobalt, Co	10 U	2.19E+00	2,190 ppb	NO	NO
Copper, Cu	12	1.30E+00	1,300 ppb	NO	NO
Ethylbenzene	0.5U	7.00E-01	700 ppb	NO	YES
Iron, Fe	190	NA, not on Tier 2 Table	NA	NO	NO
Lead, Pb	56	Not found in RFCA Tier 2 Table	NA	The MCL for lead is 15 ppb	YES Under the Safe Drinking Water Act, 15 ppb is the MCL for lead.

1

Sump 125, Building 123, Rinsate Sample
Sampled 3/10/98
Summarized Monday March 23 1998
Ted A Hopkins

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	Is the contaminant a "Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
Lithium, Li	5 U	7.30E+01	73,000 ppb	NO	NO
Magnesium, Mg	3500	Not found in RFCA Tier 2 Table	NA	NO	NO
Manganese, Mn	5 U	1.83E-01	183 ppb	NO	NO
Mercury, Hg	0.2 U	2.00E-03	2 ppb	NO	YES
Methylene chloride	0.5U	5.00E-03	5 ppb	NO	YES
Molybdenum, Mo	50 U	1.83E-01	183 ppb	NO	NO
Nickel, Ni	10 U	1.00E-01	100 ppb	NO	NO
Potassium, K	1,100	Not found in the RFCA Tier 2 Table	NA	NO	NO
Pyridine	70 U	Not on Tier 2 List	NA	NA, not on Tier 2 list.	YES
Selenium, Se	50 U	5.00E-02	50 ppb	NO	YES
Silver, Ag	5 U	1.83E-01	183 ppb	NO	YES
Sodium	8,400	Not found in RFCA Tier 2 Table	NA	NO	NO
Strontium, Sr	120	2.19E+01	21,900 ppb	NO	NO
Tetrachloroethylene	0.5 U	5.00E-03	5 ppb	NO	YES
Thallium, Tl	250 U	2.00E-03	2 ppb	NO	NO
Tin, Sn	50 U	2.19E+01	21,900 ppb	NO	NO
Toluene	0.5U	1.00E+00	1000 ppb	NO	YES
Trichloroethylene	0.5U	5.00E-03	5 ppb	NO	YES
Vanadium, V	5 U	2.56E-01	256 ppb	NO	NO
Vinyl chloride	0.5U	2.00E-03	2 ppb	NO	YES
Xylenes	0.5U	1.00E+01	10,000 ppb	NO	YES
Zinc, Zn	28	1.10E+01	11,000 ppb	NO	NO

Sump 125, Building 123, Rinsate Sample
Sampled 3/10/98
Summarized Monday, March 23, 1998
Ted A. Hopkins

Need

APO SAMPLE RECEIPT

This sample receipt is supplied to waste generators as notification of sample collection. Inquiries into the status of this sample may be directed to the Analytical Projects Office (APO) by calling 966-2403, 966-7789, or 966-3771. The APO references samples by the following identification numbers:

RIN:	98A1028	Waste Stream ID:	123-0-0
APO Event:	98A1028-001	Customer Sample ID:	SAMPLE 1
Duplicate ID:		Field Blank ID:	
Issue Date:	02/09/98	Equipment Blank ID:	
		Trip Blank ID:	

Sample Description: BLDG 123 SUMP
Other Id: RCRA SAMPLE
Sample Location: BLDG 123, ROOM 125

Analyses Requested:	**Bottle ID**
AQUEOUS RADSCREEN - DOT	98A1028-001.001 TNU
✓GROSS ALPHA/BETA (AQUEOUS)	98A1028-001.001
✓FINGERPRINT (559)	98A1028-001.002 559
✓SW-846 8260 (Water, Aqueous Waste)	98A1028-001.003
✓SW-846 8260 (Water, Aqueous Waste)	98A1028-001.004
✓SW-846 8270B (TCLP Extracts)	98A1028-001.005
✓TOTAL METALS SW-846 (HG)	98A1028-001.006

RECRU for PWRE

		Phone	Pager
Date Sampled:			
Process Contact:	MARY AYCOCK	5309	7508
Alternate Contact:	P. VALENTINELLI	6047	

Returning Excess Sample Material

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulations (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposed will not be returned.

INTER-DEPARTMENT DELIVERY:

Deliver To:
Building: Organization:

Date: 02/09/98 Page: 4

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80402
(303) 966-6860

RIN: 98A1028
Report Date: 02/15/98

Sample and Duplicate Analysis Results

Customer Sample ID	Lab Sample ID	Gross Alpha			Gross Beta			Units	QC Batch
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
98A1028-001.001	98020150-01	2	1	1	1	1	2	pCi/l	98AB028
98A1028-001.001	98020150-05 D	1	1	1	2	1	2	pCi/l	98AB028

Preparation Blank Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA	
98AB028	98020150-06	0.0	0.7	1.2	0.2	1.3	2.2	pCi/l

LCS Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units	SRM
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
98AB028	98020150-07	20.0	4.5	4.8	22.1	5.1	6.9	pCi/l	8AB_CTRL10

0009

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80402
(303)966-6860

RIN: 98A1028
Report Date: 02/15/98

Method Summary

Gross alpha and gross beta activities are measured by evaporating an aliquot of the prepared sample onto a counting planchet and counting the alpha and beta activities in a low background, thin-windowed, gas flow proportional counter. Organics or combustible solids are ashed, the residue dissolved in acid, and the solution or an aliquot of the solution is evaporated onto a counting planchet. Aqueous samples are concentrated and then evaporated onto a counting planchet. Analysis of aqueous samples and prepared non-aqueous samples is described in detail in Rocky Flats Procedure, L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"*. Preparation of oils, solvents and other combustible organics is described in L-6194, *"Preparation of Oils and Solvents for Analysis of Gross Alpha and Gross Beta Activity"*. The counting procedure is described in procedure L-6295, *"Operation of the Tennelec LB4100 Gas Proportional Counters"*.

The detector counting efficiency and self-absorption effects of the salt residue on the planchet are determined from calibration curves which are generated by counting several planchets prepared with a known amount of alpha or beta activity and increasing amounts of salt (0 to 100 mg). Americium-241 is used as the spike for the alpha curves and a solution of Sr-90, Y-90 is used for the beta curves. These standards are prepared from certified reference material which is traceable to the National Institute of Standards Technology (NIST).

The theoretical minimum detectable activity (MDA) for the analysis is based on the detector background, detector efficiency and self-absorption effects, count time and quantity of sample analyzed. The MDA for each analysis is calculated and is also reported. If the reported result is based on the average of two or more counts, the average MDA is reported.

Quality Control Summary

A sample batch consists of eleven or fewer samples, a duplicate of one of the samples, an alpha and a beta laboratory control sample, and a preparation blank. Each set of samples forms a "QC Batch" and is assigned a QC batch number. A sample can be traced back to its corresponding quality control samples through the QC Batch number. The preparation blank (PB), an aliquot of deionized, distilled water, is prepared and analyzed with the samples to confirm that the samples were not contaminated during the analysis. The activities reported for samples and standards were not corrected for preparation blank activity. The alpha and beta laboratory control samples are aqueous standards of ^{241}Am and ^{90}Sr, respectively. The SRM standards used to prepared these standards are traceable to NIST. The duplicate, designated as the sample ID followed by a "D", is a second aliquot of one of the samples in the QC Batch which is carried through the procedure as a separate sample.

The instrument QC includes determining instrument backgrounds weekly and counting an instrument check source daily on the Tennelec LB4100 multidetector gas proportional counters. The instrument backgrounds are based on the average of at least five, and normally ten or more, 4 hour counts. The instrument check sources are counted daily to verify that the efficiencies of the detectors have not changed. A summary of the instrument backgrounds is included in the instrument raw data section of this report. The daily check source information is available in the supporting documentation package.

Narrative

This sample was submitted for a radscreen analysis and also for analysis of gross alpha/gross beta activity. The radscreen planchets were prepped according to procedure L-6278, *"Sample Preparation for Radiological Screening by Gas Proportional Counting"*, in QC batch 98RS042. A copy of the radscreen report is included in Appendix A of this report. The samples were prepared for analysis of gross alpha/gross beta activity using procedure L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"* in QC batch 98AB028. Sample 98020150-05 is a lab duplicate of sample 98020150-01. There were no problems noted with these analyses and all QC data are acceptable.

B123, Rm 125 sump

98 3110

Recra LabNet - Chicago
METHOD 8260 VOLATILES

Report Date: 03/10/98 15:33

RFW Batch Number: 9802G393 Client: ICF Kaiser-98A1028 Work Order: 11830-001-001-9 Page: 1a

	Cust ID:	98A1028-001. 003		98A1028-001. 003		VBLKFM		VBLKFM BS	
Sample Information	RFW#:	001		001 DL		98GVT054-MB1		98GVT054-MB1	
	Matrix:	WATER		WATER		WATER		WATER	
	D.F.:	1		5		1		1	
	Units:	UG/L		UG/L		UG/L		UG/L	
Surrogate	4-Bromofluorobenzene	97	%	88	%	98	%	109	%
	Toluene-d8	100	%	96	%	100	%	105	%
Recovery	1,2-Dichloroethane-d4	106	%	103	%	109	%	120	%
			fl		fl		fl		fl
Dichlorodifluoromethane		0.5	U	NA		0.5	U	78	%
Chloromethane		0.5	U	NA		0.5	U	117	%
Vinyl chloride		0.5	U	NA		0.5	U	116	%
Bromomethane		0.5	U	NA		0.5	U	91	%
Chloroethane		0.5	U	NA		0.5	U	112	%
Trichlorofluoromethane		0.5	U	NA		0.5	U	89	%
1,1-Dichloroethene		0.5	U	NA		0.5	U	99	%
Methylene Chloride		0.5	U	NA		0.5	U	102	%
trans-1,2-Dichloroethene		0.5	U	NA		0.5	U	103	%
1,1-Dichloroethane		0.5	U	NA		0.5	U	113	%
cis-1,2-Dichloroethene		0.5	U	NA		0.5	U	108	%
2,2-Dichloropropane		0.5	U	NA		0.5	U	87	%
Bromochloromethane		0.5	U	NA		0.5	U	102	%
Chloroform			E	61		0.5	U	118	%
1,1,1-Trichloroethane		0.5	U	NA		0.5	U	118	%
1,1-Dichloropropene		0.5	U	NA		0.5	U	113	%
Carbon Tetrachloride		0.5	U	NA		0.5	U	109	%
Benzene		0.5	U	NA		0.5	U	100	%
1,2-Dichloroethane		0.5	U	NA		0.5	U	114	%
Trichloroethene		0.5	U	NA		0.5	U	99	%
1,2-Dichloropropane		0.5	U	NA		0.5	U	112	%
Dibromomethane		0.5	U	NA		0.5	U	105	%
Bromodichloromethane		7		NA		0.5	U	108	%
Toluene		0.5	U	NA		0.5	U	100	%
1,1,2-Trichloroethane		0.5	U	NA		0.5	U	111	%
Tetrachloroethene		0.5	U	NA		0.5	U	95	%

*= Outside of EPA CLP QC limits.

PRELIMINARY REPORT

B123, RM 125 sump.

RFW Batch Number: 9802G393 Client: ICF Kaiser-98A1028 Work Order: 11830-001-001-9 Page: 1b

Cust ID:	98A1028-001.003		98A1028-001.003	VBLKFM		VBLKFM BS	
RFW#:	001		001 DL	98GVT054-MB1		98GVT054-MB1	
1,3-Dichloropropane	0.5	U	NA	0.5	U	106	%
Dibromochloromethane	0.5	U	NA	0.5	U	99	%
1,2-Dibromoethane	0.5	U	NA	0.5	U	103	%
Chlorobenzene	0.5	U	NA	0.5	U	102	%
1,1,1,2-Tetrachloroethane	0.5	U	NA	0.5	U	101	%
Ethylbenzene	0.5	U	NA	0.5	U	102	%
Styrene	0.5	U	NA	0.5	U	106	%
Bromoform	0.5	U	NA	0.5	U	104	%
Isopropylbenzene	0.5	U	NA	0.5	U	100	%
Bromobenzene	0.5	U	NA	0.5	U	97	%
1,1,2,2-Tetrachloroethane	0.5	U	NA	0.5	U	98	%
1,2,3-Trichloropropane	0.5	U	NA	0.5	U	92	%
n-Propylbenzene	0.5	U	NA	0.5	U	103	%
2-Chlorotoluene	0.5	U	NA	0.5	U	104	%
4-Chlorotoluene	0.5	U	NA	0.5	U	103	%
1,3,5-Trimethylbenzene	0.5	U	NA	0.5	U	98	%
tert-Butylbenzene	0.5	U	NA	0.5	U	99	%
1,2,4-Trimethylbenzene	0.5	U	NA	0.5	U	102	%
sec-Butylbenzene	0.5	U	NA	0.5	U	102	%
1,3-Dichlorobenzene	0.5	U	NA	0.5	U	100	%
p-Isopropyltoluene	0.5	U	NA	0.5	U	98	%
1,4-Dichlorobenzene	0.5	U	NA	0.5	U	96	%
1,2-Dichlorobenzene	0.5	U	NA	0.5	U	98	%
n-Butylbenzene	0.5	U	NA	0.5	U	104	%
1,2-Dibromo-3-chloropropane	0.5	U	NA	0.5	U	113	%
1,2,4-Trichlorobenzene	0.5	U	NA	0.5	U	99	%
Hexachlorobutadiene	0.5	U	NA	0.5	U	94	%
Naphthalene	0.5	U	NA	1		80	%
1,2,3-Trichlorobenzene	0.5	U	NA	0.5	U	99	%
cis-1,3-Dichloropropene	0.5	U	NA	0.5	U	97	%
trans-1,3-Dichloropropene	0.5	U	NA	0.5	U	104	%
Acetone	27		NA	2	U	121	%
2-Butanone	2	U	NA	2	U	96	%
Carbon Disulfide	2	U	NA	2	U	84	%
4-Methyl-2-pentanone	2	U	NA	2	U	103	%
2-Hexanone	2	U	NA	2	U	104	%

*= Outside of EPA CLP QC limits.

PRELIMINARY REPORT

B123, RM 125 Sump

RFW Batch Number: 9802G393 Client: ICF Kaiser-98A1028 Work Order: 11830-001-001-9 Page: 1c

Cust ID:	98A1028-001.003	98A1028-001.003	VBLKFM	VBLKFM BS	
RFW#:	001	001 DL	98GVT054-MB1	98GVT054-MB1	
Trichlorotrifluoroethane	0.5 U	NA	0.5 U	0.5 U	
Xylene (total)	0.5 U	NA	0.5 U	109 %	
DiBROMOFLUOROMETHANE	~~99 %~~	~~98 %~~	~~110 %~~	~~113 %~~	not QC 3/10/98

*= Outside of EPA CLP QC limits.

PRELIMINARY REPORT

8123, Rm 125 Sump MR 3/10/98

Recra LabNet - Chicago
SEMIVOLATILES BY GC/MS, TCLP LEACHATE

RFW Batch Number: 9802G393 | Client: ICF Kaiser-98A1028 | Work Order: 11830-001-001-9 | Report Date: 03/06/98 13:23 | Page: 1a

Sample Information	Cust ID:	98A1028-001. 005	98A1028-001. 005	SBLKIM	SBLKIM BS	SBLKIN
	RFW#:	003	003 MS	98GB0062-MB1	98GB0062-MB1	98GB0062-TC1
	Matrix:	WATER	WATER	WATER	WATER	WATER
	D.F.:	1	1	1	1	1
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Surrogate Recovery	2-Fluorophenol	67 %	62 %	71 %	71 %	68 %
	Phenol-d5	75 %	79 %	76 %	85 %	76 %
	Nitrobenzene-d5	87 %	90 %	90 %	98 %	84 %
	2-Fluorobiphenyl	94 %	99 %	93 %	104 %	87 %
	2,4,6-Tribromophenol	83 %	108 %	85 %	109 %	86 %
	p-Terphenyl-d14	88 %	85 %	82 %	87 %	83 %
Pyridine		70 U	70 %	7 U	77 %	70 U
1,4-Dichlorobenzene		60 U	81 %	5 U	74 %	50 U
o-Cresol		60 U	86 %	6 U	90 %	60 U
meta & para-Cresol		30 U	83 %	3 U	86 %	30 U
Hexachloroethane		70 U	82 %	7 U	75 %	70 U
Nitrobenzene		40 U	83 %	4 U	88 %	40 U
Hexachlorobutadiene		80 U	83 %	8 U	80 %	80 U
2,4,6-Trichlorophenol		30 U	82 %	3 U	87 %	30 U
2,4,5-Trichlorophenol		40 U	91 %	4 U	74 %	40 U
2,4-Dinitrotoluene		20 U	106 %	2 U	101 %	20 U
Hexachlorobenzene		30 U	98 %	3 U	101 %	30 U
Pentachlorophenol		60 U	87 %	6 U	89 %	60 U

*= Outside of EPA CLP QC limits.

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 03/12/98

RECRA LOT #: 9802G393

CLIENT: ICF Kaiser-98A1028
WORK ORDER: 11830-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-004	98A1028-001.006	Silver, Total	0.15 u	UG/L	0.15
		Aluminum, Total	63.6	UG/L	6.6
		Arsenic, Total	0.80 u	UG/L	0.80
		Barium, Total	25.4	UG/L	0.10
		Beryllium, Total	0.10 u	UG/L	0.10
		Calcium, Total	15000	UG/L	3.8
		Cadmium, Total	0.20 u	UG/L	0.20
		Cobalt, Total	0.25 u	UG/L	0.25
		Chromium, Total	4.2	UG/L	0.20
		Copper, Total	12.0	UG/L	0.35
		Iron, Total	188	UG/L	8.4
		Mercury, Total	0.10 u	UG/L	0.10
		Potassium, Total	1070	UG/L	3.7
		Lithium, Total	4.8	UG/L	0.65
		Magnesium, Total	3480	UG/L	3.8
		Manganese, Total	3.3	UG/L	0.25
		Molybdenum, Total	23.2	UG/L	0.25
		Sodium, Total	8430	UG/L	88.5
		Nickel, Total	1.6	UG/L	0.30
		Lead, Total	55.9	UG/L	0.60
		Antimony, Total	0.87	UG/L	0.70
		Selenium, Total	0.90 u	UG/L	0.90
		Tin, Total	0.96	UG/L	0.85
		Strontium, Total	124	UG/L	0.10
		Thallium, Total	1.2 u	UG/L	1.2
		Vanadium, Total	0.30 u	UG/L	0.3
		Zinc, Total	27.8	UG/L	0.3

Thermo NUtech - Rocky Flats
Radscreen Results

RIN: 98A1028
Analysis: Radscreen
Report Date: 02/13/98

Distribution/Fax: APO/3400

Laboratory Sample ID	APO Sample ID			Matrix	Gross Alpha		Gross Beta		Total Activity pCi/ml	DOT Class
	RIN	Event	Bottle		pCi/L	2σ	pCi/L	2σ		
98020150-01	98A1028	001	001	Water	24	57	12	84	0.18	NONRAD

DOT Classification <2000 pCi/ml total activity is NONRAD
>= 2000 pCi/ml total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements. If the measured activity is negative, 0 pCi/L (instead of the negative value) is used to calculate the total activity.

Analysis Methods Sample Preparation Procedure: L-6278-A, "Sample Preparation for Radiological Screening by Gas Proportional Counting". Counting Procedure: L-6295-A, "Operation of Tennelec LB4100 Gas Proportional Counters".

K M Hagglund Date 2/13/98
Technical Review

Donald R. Taylor Date 2/13/98
Quality Assurance Review

Thermo NUtech - Rocky Flats
RFETS - Building T690D
Golden, Colorado 80402
(303) 966-6860

RP-0021 (11/97)

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name: 559 Radioanalytical Laboratories		RF Sample ID:	98A1028-001.002
Lab Code: 559 RIL		Lab Sample ID:	98A1028-001.002
		RIN:	98A1028-001.002

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 6/19/1997.

Case Narrative:

On February 11, 1998 this sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis.

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories | RF Sample ID: 98A1028-001.002

Lab Code: 559 RIL | Lab Sample ID: 98A1028-001.002

Date of Analysis: Feb 12 1998 | RIN: 98A1028-001.002

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, non-viscous, transparent, colorless liquid.			N A
	Water Test	Positive			N A
10-29-7	pH	5			S. U.
	Specific Gravity	1.0075			*1
	Miscible with	Water			N A
	Reactivity with Water	No			N A
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval:

Peer Review:

SAMPLERS (Signature/Emp. No.) [illegible] / 573352 [illegible] / 584932

REPORT ID # 98A1028

Lab Location: ~~371~~ | 559 (circled) | ~~771~~ | ~~881~~ | ~~Contractor Lab~~

MBA: ~~137-37~~ | 086431 | 036471 | 058331

SAMPLE LOCATION
Bldg 123, Rm 125

KAISER-HILL ANALYTICAL LABORATORIES
CHAIN OF CUSTODY

Date	Time	Event #	Bottle #	Container # (If Required)	Cooled to 4°C	NaOH	HNO3	H2SO4	None	α/β Screen	Gross α/β	Total VOA	Total SVOA	ICPES	ICPES & Hg	TCLP VOA	TCLP SVOA	Metals - TCLP	Metals - TCLP & Hg	VOA Sweep	MetalScreen	Fingerprint	Cn	Iso	g/l	TOTAL METALS + Hg		
2-11-98	1015	001	002						X													X						

CEH 2-11-98

Relinquished By / ORG	Date/Time		Received By / ORG.	Date/Time	
[illegible] / ASI	2-11-98	1400	LB Johnson / Labs	2/11/98	1400
LB Johnson / Labs	2/11/98	1400	[illegible] 102-6 / Labs	2/11/98	1400
/			/		
/			/		
/			/		

LABORATORY USE ONLY	Y / N
PCKG REC'D/CUSTODY SEALS INTACT	N/A
SAMPLE LABELS/COCs AGREE	
TEMPERATURE AT TIME OF RECIEPT ___°C	N/A
CORRECTED COPY ATTACHED	

Charge #: EM243411 Cost Center:

Remarks: PRIORITY 2

NMC Approval for movement of nonaccountable radioactive samples from an MAA. TID/NMDTR is not required for movement of this material
NMC Transfer Approval:

Appendix D - Analytical Results for the Underground Pipe to Tank D-853 in Building 428

Rinsate sample from Tank 853, Building 428
Rinsate sample for underground portion of RCRA Unit 40 from B123 to B428.
Sample # 98A097-001

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	"Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
1,1 Dichloroethylene	0.5U	7.00E-03	7 ppb	NO	YES
1,1,2-Trichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
1-1-1-Trichloroethane	0.5U	2.00E-01	200 ppb	NO	YES
1-2-Dichloroethane	0.5U	5.00E-03	5 ppb	NO	YES
2-Butanone (Methyl ethyl ketone)	2 U	2.47E+00	2470 ppb	NO	YES
Acetone	2U	3.65E+00	3650 ppb	NO	YES
Aluminum, Al	271 Total	1.06E+02	106,000 ppb	NO	NO
Antimony, Sb	2.2 Total	6.00E-03	6 ppb	NO	NO
Arsenic, As	1.6 U Total	5.00E-02	50 ppb	NO	YES
Barium, Ba	37.1 Total	2.00E+00	2,000 ppb	NO	YES
Benzene	0.5 U	5.00E-03	5 ppb	NO	YES
Beryllium, Be	0.2U Total	4.00E-03	4 ppb	NO	NO
Bromodichloromethane	5	1.00E-01	100 ppb	NO	NO
Cadmium, Cd	0.40U Total	5.00E-03	5 ppb	NO	YES
Carbon disulfide	2.0 U	2.76E-02	27.6 ppb	NO	YES
Carbon tetrachloride	0.5U	5.00E-03	5 ppb	NO	YES
Chlorobenzene	0.5U	1.00E-01	100 ppb	NO	YES
Chloroform	41 E Background Contaminant	1.00E-01	100 ppb	NO	YES
Chromium, Cr	588 Total	1.00E-01	100 ppb	YES	YES
Cobalt, Co	0.5 U Total	2.19E+00	2,190 ppb	NO	NO
Copper, Cu	19.8 Total	1.30E+00	1,300 ppb	NO	NO
Ethylbenzene	0.5U	7.00E-01	700 ppb	NO	YES

Rinsate sample for underground RCRA Unit 40 Waste Process Lines
Underground Line running from B123 to B428
Sample from T853, outlet
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

Contaminants of concern and any contaminant present above action levels	UG/L in sample or ppb	Tier 2 RFCA Action Levels (mg/L or ppm)	Conversion of Tier 2 Action Levels to ppb	Is contaminant present above Tier 2 Action Levels?	"Contaminant of Concern" as identified in the RCRA Closure Plan for RCRA Unit 40?
Iron, Fe	3310	NA, not on Tier 2 Table	NA	NO	NO
Lead, Pb	21.7	Not found in RFCA Tier 2 Table DRAFT Standard 15 ppb	15 ppb	YES 15 ppb.	YES
Lithium, Li	3.1 Total	7.30E+01	73,000 ppb	NO	NO
Magnesium, Mg	3200 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Manganese, Mn	26	1.83E-01	183 ppb	NO	NO
Mercury, Hg	1.3 Total	2.00E-03	2 ppb	NO	YES
Methylene chloride	0.5U	5.00E-03	5 ppb	NO	YES
Molybdenum, Mo	51.1 Total	1.83E-01	183 ppb	NO	NO
Nickel, Ni	64 Total	1.00E-01	100 ppb	NO	NO
Potassium, K	1,140 Total	Not found in the RFCA Tier 2 Table	NA	NO	NO
Pyridine	70 U	Not on Tier 2 List	NA	NA, not on Tier 2 list.	YES
Selenium, Se	1.8 U Total	5.00E-02	50 ppb	NO	YES
Silver, Ag	10.0 U Total	1.83E-01	183 ppb	NO	YES
Sodium	50,300 Total	Not found in RFCA Tier 2 Table	NA	NO	NO
Strontium, Sr	111	2.19E+01	21,900 ppb	NO	NO
Tetrachloroethylene	0.5 U	5.00E-03	5 ppb	NO	YES
Thallium, Tl	2.3 U Total	2.00E-03	2 ppb	NO	NO
Tin, Sn	14.6 Total	2.19E+01	21,900 ppb	NO	NO
Toluene	0.5U	1.00E+00	1000 ppb	NO	YES
Trichloroethylene	0.5U	5.00E-03	5 ppb	NO	YES
Vanadium, V	2.5	2.56E-01	256 ppb	NO	NO
Vinyl chloride	0.5U	2.00E-03	2 ppb	NO	YES
Xylenes	0.5U	1.00E+01	10,000 ppb	NO	YES
Zinc, Zn	25.2 Total	1.10E+01	11,000 ppb	NO	NO

Rinsate sample for underground RCRA Unit 40 Waste Process Lines
Underground Line running from B123 to B428
Sample from T853, outlet
Summarized Tuesday, March 24, 1998
Ted A. Hopkins

APO SAMPLE RECEIPT

This sample receipt is supplied to waste generators as notification of sample collection. Inquiries into the status of this sample may be directed to the Analytical Projects Office (APO) by calling 966-2403, 966-7789, or 966-3771. The APO references samples by the following identification numbers:

RIN:	98A0997	Waste Stream ID:	428-0-0
APO Event:	98A0997-001	Customer Sample ID:	TANK D853
Duplicate ID:		Field Blank ID:	
Issue Date:	02/03/98	Equipment Blank ID:	
		Trip Blank ID:	

Sample Description: FINAL RINSATE BLDG 428
Other Id:
Sample Location: BLDG 428, TANK 853, UNDERGROUND ✓

Analyses Requested:	Bottle ID
AQUEOUS RADSCREEN - DOT	98A0997-001.001
✓ GROSS ALPHA/BETA - NO RAD ADDED (WASTE)	98A0997-001.001
✓ FINGERPRINT (559)	98A0997-001.002
✓ SW-846 8260 (Water, Aqueous Waste)	98A0997-001.003
✓ SW-846 8260 (Water, Aqueous Waste)	98A0997-001.004
✓ SW-846 8270B (TCLP Extracts)	98A0997-001.005
✓ TOTAL METALS SW-846 (HG)	98A0997-001.006

		Phone	Pager
Date Sampled:			
Process Contact:	M. AYCOCK	5309	7508
Alternate Contact:	P. VALENTINELLI	6047	

Returning Excess Sample Material

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulations (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposed will not be returned.

INTER-DEPARTMENT DELIVERY:

Deliver To:
Building: Organization:

Date: 02/03/98 Page: 4

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80402
(303) 966-6860

RIN: 98A0997
Report Date: 02/25/98

Sample and Duplicate Analysis Results

Customer Sample ID	Lab Sample ID	Gross Alpha			Gross Beta			Units	QC Batch
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
98A0997-001.001	98020070-01	1.4	0.8	1.8	2.2	1.0	2.3	pCi/l	98AB026

Preparation Blank Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA	
98AB026	98020069-09	-0.1	0.5	1.2	0.6	0.9	2.2	pCi/l

LCS Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units	SRM
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
98AB026	98020069-10	24.4	3.5	5.1	24.6	3.7	6.9	pCi/l	8AB_CTRL10

Associated Duplicate Analysis Results

Customer Sample ID	Lab Sample ID	Gross Alpha			Gross Beta			Units	QC Batch
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
98A0996-004.019	98020069-04	0.9	0.4	1.4	1.3	0.7	2.2	pCi/l	98AB026
98A0996-004.019	98020069-08 D	0.7	0.6	1.4	0.5	1.0	2.2	pCi/l	98AB026

0009

Method Summary

Gross alpha and gross beta activities are measured by evaporating an aliquot of the prepared sample onto a counting planchet and counting the alpha and beta activities in a low background, thin-windowed, gas flow proportional counter. Organics or combustible solids are ashed, the residue dissolved in acid, and the solution or an aliquot of the solution is evaporated onto a counting planchet. Aqueous samples are concentrated and then evaporated onto a counting planchet. Analysis of aqueous samples and prepared non-aqueous samples is described in detail in Rocky Flats Procedure, L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"*. Preparation of oils, solvents and other combustible organics is described in L-6194, *"Preparation of Oils and Solvents for Analysis of Gross Alpha and Gross Beta Activity"*. The counting procedure is described in procedure L-6295, *"Operation of the Tennelec LB4100 Gas Proportional Counters"*.

The detector counting efficiency and self-absorption effects of the salt residue on the planchet are determined from calibration curves which are generated by counting several planchets prepared with a known amount of alpha or beta activity and increasing amounts of salt (0 to 100 mg). Americium-241 is used as the spike for the alpha curves and a solution of Sr-90, Y-90 is used for the beta curves. These standards are prepared from certified reference material which is traceable to the National Institute of Standards Technology (NIST).

The theoretical minimum detectable activity (MDA) for the analysis is based on the detector background, detector efficiency and self-absorption effects, count time and quantity of sample analyzed. The MDA for each analysis is calculated and is also reported. If the reported result is based on the average of two or more counts, the average MDA is reported.

Quality Control Summary

A sample batch consists of eleven or fewer samples, a duplicate of one of the samples, an alpha and a beta laboratory control sample, and a preparation blank. Each set of samples forms a "QC Batch" and is assigned a QC batch number. A sample can be traced back to its corresponding quality control samples through the QC Batch number. The preparation blank (PB), an aliquot of deionized, distilled water, is prepared and analyzed with the samples to confirm that the samples were not contaminated during the analysis. The activities reported for samples and standards were not corrected for preparation blank activity. The alpha and beta laboratory control samples are aqueous standards of ^{241}Am and ^{90}Sr, respectively. The SRM standards used to prepared these standards are traceable to NIST. The duplicate, designated as the sample ID followed by a "D", is a second aliquot of one of the samples in the QC Batch which is carried through the procedure as a separate sample.

The instrument QC includes determining instrument backgrounds weekly and counting an instrument check source daily on the Tennelec LB4100 multidetector gas proportional counters. The instrument backgrounds are based on the average of at least five, and normally ten or more, 4 hour counts. The instrument check sources are counted daily to verify that the efficiencies of the detectors have not changed. A summary of the instrument backgrounds is included in the instrument raw data section of this report. The daily check source information is available in the supporting documentation package.

Narrative

This sample was submitted for radscreen analysis and analysis of gross alpha/gross beta activity for No-Rad-Added assessment.. The radscreen analyses were done according to procedure L-6278, *"Sample Preparation for Radiological Screening by Gas Proportional Counting"* in QC batch 98RS038. The gross alpha/gross beta analyses were done using procedure L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"* incorporating the quality control reqOuirements of procedure L-6194, *"Preparation of Oils and Solvents for Analysis of Gross Alpha and Gross Beta Activity"* in order to comply with the No-Rad-Added program quality requirements. The gross alpha/gross beta analyses were done in QC batch 98AB026. This batch also included samples from RIN 98A0996. The lab duplicate for the batch was done using sample 98020069-04 from 98A0996. This report contains copies of documents which are common to both reports. The originals are included in report 98A0996. There were no problems noted with the analysis of this sample and all QC data for the batch are acceptable.

Recra LabNet - Chicago
METHOD 8260 VOLATILES — Tank 853

RFW Batch Number: 9802G376 Client: ICF Kaiser-98A0997 Work Order: 11830-001-001-9

Report Date: 02/24/98 14:11

Page: 1a

Tank D853

Sample Information		98A0997-001. 003	98A0997-001. 003	VBLKDA	VBLKDA BS	VBLKAX	VBLKAX BS
	RFW#:	001	001 DL	98GVF055-MB1	98GVF055-MB1	98GVF056-MB1	98GVF056-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1	5	1	1	1	1
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate Recovery	4-Bromofluorobenzene	107 %	104 %	104 %	103 %	107 %	99 %
	Toluene-d8	108 %	104 %	107 %	101 %	112 %	106 %
	1,2-Dichloroethane-d4	107 %	106 %	98 %	98 %	101 %	103 %
		fl	fl	fl	fl	fl	fl
Dichlorodifluoromethane		0.5 U	NA	0.5 U	58 %	0.5 U	72 %
Chloromethane		0.5 U	NA	0.5 U	101 %	0.5 U	102 %
Vinyl chloride		0.5 U	NA	0.5 U	96 %	0.5 U	91 %
Bromomethane		0.5 U	NA	0.5 U	74 %	0.5 U	69 %
Chloroethane		0.5 U	NA	0.5 U	99 %	0.5 U	102 %
Trichlorofluoromethane		0.5 U	NA	0.5 U	61 %	0.5 U	60 * %
1,1-Dichloroethene		0.5 U	NA	0.5 U	72 %	0.5 U	87 %
Methylene Chloride		0.5 U	NA	0.5 U	75 %	0.5 U	82 %
trans-1,2-Dichloroethene		0.5 U	NA	0.5 U	80 %	0.5 U	85 %
1,1-Dichloroethane		0.5 U	NA	0.5 U	82 %	0.5 U	83 %
2,2-Dichloropropane		0.5 U	NA	0.5 U	91 %	0.5 U	95 %
cis-1,2-Dichloroethene		0.5 U	NA	0.5 U	92 %	0.5 U	97 %
Bromochloromethane		0.5 U	NA	0.5 U	94 %	0.5 U	94 %
Chloroform		E	41	0.5 U	85 %	0.5 U	85 %
1,1,1-Trichloroethane		0.5 U	NA	0.5 U	78 %	0.5 U	82 %
1,1-Dichloropropene		0.5 U	NA	0.5 U	86 %	0.5 U	91 %
Carbon Tetrachloride		0.5 U	NA	0.5 U	74 * %	0.5 U	79 %
Benzene		0.5 U	NA	0.5 U	85 %	0.5 U	90 %
1,2-Dichloroethane		0.5 U	NA	0.5 U	81 %	0.5 U	84 %
Trichloroethene		0.5 U	NA	0.5 U	85 %	0.5 U	88 %
1,2-Dichloropropane		0.5 U	NA	0.5 U	92 %	0.5 U	95 %
Dibromomethane		0.5 U	NA	0.5 U	90 %	0.5 U	95 %
Bromodichloromethane		5	NA	0.5 U	84 %	0.5 U	86 %
Toluene		0.5 U	NA	0.5 U	87 %	0.5 U	90 %
1,1,2-Trichloroethane		0.5 U	NA	0.5 U	91 %	0.5 U	91 %
Tetrachloroethene		0.5 U	NA	0.5 U	85 %	0.5 U	82 %

*= Outside of EPA CLP QC limits.

RFW Batch Number: 98026376 Client: ICF Kaiser-98A0997-T853 Work Order: 11830-001-001-9 Page: 1b

	Cust ID: 98A0997-001.003		98A0997-001.003	VBLKDA		VBLKDA BS		VBLKAX		VBLKAX BS	
RFW#:	001		001 DL	98GVF055-MB1		98GVF055-MB1		98GVF056-MB1		98GVF056-MB1	
1,3-Dichloropropane	0.5	U	NA	0.5	U	96	%	0.5	U	93	%
Dibromochloromethane	0.5	U	NA	0.5	U	88	%	0.5	U	85	%
1,2-Dibromoethane	0.5	U	NA	0.5	U	93	%	0.5	U	96	%
Chlorobenzene	0.5	U	NA	0.5	U	89	%	0.5	U	88	%
1,1,1,2-Tetrachloroethane	0.5	U	NA	0.5	U	86	%	0.5	U	85	%
Ethylbenzene	0.5	U	NA	0.5	U	87	%	0.5	U	84	%
Styrene	0.5	U	NA	0.5	U	92	%	0.5	U	88	%
Bromoform	0.5	U	NA	0.5	U	92	%	0.5	U	90	%
Isopropylbenzene	0.5	U	NA	0.5	U	84	%	0.5	U	84	%
Bromobenzene	0.5	U	NA	0.5	U	89	%	0.5	U	88	%
1,1,2,2-Tetrachloroethane	0.5	U	NA	0.5	U	94	%	0.5	U	94	%
1,2,3-Trichloropropane	0.5	U	NA	0.5	U	92	%	0.5	U	91	%
n-Propylbenzene	0.5	U	NA	0.5	U	90	%	0.5	U	86	%
2-Chlorotoluene	0.5	U	NA	0.5	U	92	%	0.5	U	92	%
4-Chlorotoluene	0.5	U	NA	0.5	U	88	%	0.5	U	88	%
1,3,5-Trimethylbenzene	0.5	U	NA	0.5	U	85	%	0.5	U	81	%
tert-Butylbenzene	0.5	U	NA	0.5	U	87	%	0.5	U	85	%
1,2,4-Trimethylbenzene	0.5	U	NA	0.5	U	87	%	0.5	U	84	%
sec-Butylbenzene	0.5	U	NA	0.5	U	86	%	0.5	U	83	%
1,3-Dichlorobenzene	0.5	U	NA	0.5	U	93	%	0.5	U	91	%
p-Isopropyltoluene	0.5	U	NA	0.5	U	84	%	0.5	U	81	%
1,4-Dichlorobenzene	0.5	U	NA	0.5	U	96	%	0.5	U	95	%
1,2-Dichlorobenzene	0.5	U	NA	0.5	U	89	%	0.5	U	89	%
n-Butylbenzene	0.5	U	NA	0.5	U	89	%	0.5	U	86	%
1,2-Dibromo-3-chloropropane	0.5	U	NA	0.5	U	100	%	0.5	U	100	%
1,2,4-Trichlorobenzene	0.5	U	NA	0.5	U	96	%	0.5	U	97	%
Hexachlorobutadiene	0.5	U	NA	0.5	U	85	%	0.5	U	82	%
Naphthalene	0.5	U	NA	0.5	U	101	%	0.5	U	103	%
1,2,3-Trichlorobenzene	0.5	U	NA	0.5	U	92	%	0.5	U	96	%
cis-1,3-Dichloropropene	0.5	U	NA	0.5	U	83	%	0.5	U	84	%
trans-1,3-Dichloropropene	0.5	U	NA	0.5	U	89	%	0.5	U	93	%
Acetone	2	U	NA	2	U	108	%	2	U	2 ~~8~~	U
2-Butanone	2	U	NA	2	U	128	%	2	U	2 ~~8~~	U
Carbon Disulfide	2	U	NA	2	U	65	%	2	U	2 ~~8~~	U
4-Methyl-2-pentanone	2	U	NA	2	U	113	%	2	U	2 ~~8~~	U
2-Hexanone	2	U	NA	2	U	124	%	2	U	2 ~~8~~	U

*= Outside of EPA CLP QC limits.

00 19

RFW Batch Number: 9802G376 Client: ICF Kaiser-98A0997 T853 Work Order: 11830-001-001-9 Page: 1c

Cust ID:	98A0997-001. 003	98A0997-001. 003	VBLKDA	VBLKDA BS	VBLKAX	VBLKAX BS
RFW#:	001	001 DL	98GVF055-MB1	98GVF055-MB1	98GVF056-MB1	98GVF056-MB1
Trichlorotrifluoroethane	2 U	NA	2 U	2 U	2 U	2 U
Xylene (total)	0.5 U	NA	0.5 U	92 %	0.5 U	88 %

*= Outside of EPA CLP QC limits.

13

Recra LabNet - Chicago
SEMIVOLATILES BY GC/MS, TCLP LEACHATE

RFW Batch Number: 98026376 Client: ICF Kaiser-98A0997 T853 Work Order: 11830-001-001-9 Report Date: 02/25/98 13:50 Page: 1a

		Tank D853					
	Cust ID:	98A0997-001. 005	SBLKHX	SBLKHX BS	SBLKHY	SBLKHZ	SBLKIA
Sample Information	RFW#:	004	98GB0056-MB1	98GB0056-MB1	98GB0056-TC1	98GB0056-TC2	98GB0056-TC3
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1	1	1	1	1	1
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Surrogate Recovery	2-Fluorophenol	61 %	60 %	85 %	70 %	68 %	76 %
	Phenol-d5	66 %	64 %	99 * %	75 %	74 %	82 %
	Nitrobenzene-d5	80 %	72 %	100 %	86 %	77 %	88 %
	2-Fluorobiphenyl	79 %	68 %	96 %	86 %	76 %	89 %
	2,4,6-Tribromophenol	55 %	51 %	71 %	56 %	60 %	66 %
	p-Terphenyl-d14	104 %	84 %	104 %	102 %	97 %	102 %
Pyridine		70 U	7 U	56 %	70 U	70 U	70 U
1,4-Dichlorobenzene		50 U	5 U	77 %	50 U	50 U	50 U
o-Cresol		60 U	6 U	89 %	60 U	60 U	60 U
meta & para-Cresol		30 U	3 U	90 %	30 U	30 U	30 U
Hexachloroethane		70 U	7 U	86 %	70 U	70 U	70 U
Nitrobenzene		40 U	4 U	95 %	40 U	40 U	40 U
Hexachlorobutadiene		80 U	8 U	67 %	80 U	80 U	80 U
2,4,6-Trichlorophenol		30 U	3 U	88 %	30 U	30 U	30 U
2,4,5-Trichlorophenol		40 U	4 U	89 %	40 U	40 U	40 U
2,4-Dinitrotoluene		20 U	2 U	106 %	20 U	20 U	20 U
Hexachlorobenzene		30 U	3 U	74 %	30 U	30 U	30 U
Pentachlorophenol		60 U	6 U	85 %	60 U	60 U	60 U

*= Outside of EPA CLP QC limits.

RECRA LABNET - CHICAGO

INORGANICS DATA SUMMARY REPORT 02/25/98

CLIENT: ICF Kaiser-98A0997 — T853
WORK ORDER: 11830-001-001-9999-00

RECRA LOT #: 9802G376

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-003	98A0997-001.006	Silver, Total	10.0	u	UG/L	10.0
	Tank D853	Aluminum, Total	271		UG/L	13.1
		Arsenic, Total	1.6	u	UG/L	1.6
		Barium, Total	37.1		UG/L	0.20
		Beryllium, Total	0.20	u	UG/L	0.20
		Calcium, Total	13100		UG/L	7.6
		Cadmium, Total	0.40	u	UG/L	0.40
		Cobalt, Total	0.50	u	UG/L	0.50
		Chromium, Total	588		UG/L	0.40
		Copper, Total	19.8		UG/L	0.70
		Iron, Total	3310		UG/L	16.9
		Mercury, Total	1.3		UG/L	0.10
		Potassium, Total	1140		UG/L	7.4
		Lithium, Total	3.1		UG/L	1.3
		Magnesium, Total	3200		UG/L	7.6
		Manganese, Total	26.0		UG/L	0.50
		Molybdenum, Total	51.1		UG/L	0.50
		Sodium, Total	50300		UG/L	177
		Nickel, Total	64.0		UG/L	0.60
		Lead, Total	21.7		UG/L	1.2
		Antimony, Total	2.2		UG/L	1.4
		Selenium, Total	1.8	u	UG/L	1.8
		Tin, Total	14.6		UG/L	1.7
		Strontium, Total	111		UG/L	0.20
		Thallium, Total	2.3	u	UG/L	2.3
		Vanadium, Total	2.5		UG/L	0.60
		Zinc, Total	25.2		UG/L	0.60

WASTE CHARACTERISTICS REPORT

Case Narrative for Fingerprint Analysis

Lab Name: 559 Radioanalytical Laboratories		RF Sample ID:	98A0997-001.002
Lab Code: 559 RIL		Lab Sample ID:	98A0997-001.002
		RIN:	98A0997-001.002

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. This method has been approved by the APO on 6/19/1997.

Case Narrative:

On February 9, 1998 this rinsate sample was received in the 559 Laboratory.
All QC was within limits. There were no anomalies during analysis.

WASTE CHARACTERISTICS REPORTING FORM 1

Analysis Data Sheet for the Fingerprint Procedure

Lab Name: 559 Radioanalytical Laboratories
Lab Code: 559 RIL
Date of Analysis: Feb 10 1998

RF Sample ID: 98A0997-001.002
Lab Sample ID: 98A0997-001.002
RIN: 98A0997-001.002

Parameter ID	Parameter Name	Result	Qualifiers C	Qualifiers Q	Units
	Physical Appearance	Single phase, transparent, colorless, non-viscous liquid.			N A
	Water Test	Positive			N A
10-29-7	pH	9			S. U.
	Specific Gravity	1.0057			*1
	Miscible with	Water			N A
	Reactivity with Water	No			N A
RFS-FP-97	Flash Point	NA, Aqueous Sample			degrees C
	Chlorinated Solvents	NA, Aqueous Sample			ppm

Notes:
NA - Not Applicable
*1 - relative to water @ 20 C

Approval: Roger A. Hornberger
Peer Review: Jon R. Weiss

Attachment 9

Asbestos Abatement Completion Document, Demolition Notification and Approvals

MEMORANDUM

To: Dorthea Hoyt

From: Mike Schluterbusch

Date: May 11, 1998

Subject: 123 Project Close-out

Dorthea, per your telephone message earlier today, I have compiled some documentation that I hope will assist you in your endeavor to close out this project. Enclosed, you will find the two demolition notifications th CDPHE, the clearance air sample results for both wings, and the memos I sent out that clears the areas for normal occupancy.

In regards to buildings 113, 114 and 123S, the Asbestos Charcterization Report Addendum to Building 123 Inspection (RMRS, March 1998) details the extent of the asbestos present in these facilities. The only asbestos containing materials left in 113 and 114 are non-friable window putty and roofing materials, which do not have to be abated prior to demolition. Building 123S is a metal structure with no suspect asbestos containing materials present at the time of inspection.

Please call me if you need additional information.

MEMORANDUM

To: Interested Parties, Building 123

From: M.N. Schluterbusch

Date: March 10, 1998

Subject: Clearance Air Sample Results, ~~West~~ East Wing

Five clearance air samples acquired in the east wing of building 123 under regulatory guidance of Colorado Department of Health and Environment Regulation #8 governing asbestos abatement clearance protocols indicate levels below 0.01 fibers per cubic centimeter or 70 structures per square millimeter. As such, this area is clear for normal occupancy and requires no respiratory protection for asbestos fibers.

Please be aware that all standard building operations, protocols and procedures are still in force as directed by building management.

DEMOLITION NOTIFICATION -- Colorado

This form requires 2 signatures and a $55 fee. Incomplete applications will be returned. Questions? Please call 692-3179.

Specify type of materials used in the construction of the building/structure, and amount, in tons:

concrete: 2,500	brick:	steel: 3	wood: 1	other:

DEMOLITION CONTRACTOR:

Denver West Remediation & Construction
Company Name

1819 Denver West Drive, Bldg 26, Ste 200
Street

Golden CO 80401
City State Zip Code

(303) 966-6598
Phone

DEMOLITION SITE:

East Side of Building 123 — 1952
Building Name (if applicable) — Year Built

State Highway 93 & Cactus Ave
Rocky Flats Environmental Tech Site
Street

Golden Jefferson CO 80401
City County Zip Code

Start date: 3/9/98 Completion date: 3/15/98
Proposed demolition start and completion dates

BUILDING OWNER:

United States Department of Energy
Rocky Flats Environmental Tech Site
Name

State Highway 93 & Cactus Ave.
Street

Golden CO 80401
City State Zip Code

(303) 966-7000
Phone

CERTIFIED ASBESTOS INSPECTOR:

Michael N. Schluterbusch
Name (Please print. Note: signature is required at bottom of this form.*)

RFETS, T130I Golden, CO 80401
Address City State Zip

505-80-5651 5/30/98
Colorado Certificate # Expiration Date

(303) 966-4215 3/10/1998
Phone Date(s) of inspection

* I certify that I possess current AHERA and state of Colorado certification as an Asbestos Building Inspector. I also certify that I have inspected the building to be demolished, as listed in the Demolition Site block, above, sampled all suspect materials (in accordance with AHERA) and had them analyzed for the presence of asbestos, and to the best of my ability have determined that (☒ appropriate box and sign in pen):

- [ ] no asbestos exists anywhere in the building
- [ ] the only ACM left in the building is VAT and/or tar-impregnated roofing felt
- [X] all ACM that I found has been completely removed from this building

Asbestos Building Inspector signature: Michael N Schluterbusch

I certify that all refrigerants from air conditioning/refrigeration appliances have been properly recovered in accordance with AQCC Regulation No. 15 (For information on CFC requirements call 692-3177.)

☐ Building Owner or ☒ Contractor

Signature: [signature] Date: 3/16/98

Revised 01/97

H:\...\forms\demoapp.doc\01L0971337

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

AIHA Certificate of Accreditation #480, Lab ID 10768

TABLE I. NIOSH 7400 FIBER COUNT ANALYSIS

RES Job Number:	**RES 49981-1**
Client:	**Rocky Mountain Remediation**
Client Project:	**98D1338, Mike Schluterbusch**
Date Samples Received:	**March 10, 1998**
Analysis Type:	**PCM 7400 A, Air**
Turnaround:	**2 Hour**

East side

Client ID Number	Lab ID Number	Air Volume Sampled (L)	Fields Analyzed	Fiber Count	Fiber Density (F/mm²)	Limit of Detection (F/cc)	Fiber Concentration (F/cc)
123-980310-MS-001	EM 334282	1324	100	1.0	BDL	0.002	BDL
123-980310-MS-002	EM 334283	1319	100	1.5	BDL	0.002	BDL
123-980310-MS-003	EM 334284	1316	100	2.5	BDL	0.002	BDL
123-980310-MS-004	EM 334285	1336	100	ND	BDL	0.002	BDL
123-980310-MS-005	EM 334286	1365	100	1.0	BDL	0.002	BDL
123-980310-MS-006	EM 334287	0	100	ND	BDL	----	----
123-980310-MS-007	EM 334288	0	100	ND	BDL	----	----

Field Area = 0.00785 sq mm Filter area = 385 sq mm

Note: Estimated Limit of Detection for 7400 Method is 7 F/sq mm

NA = Not Analyzed ND = None Detected BDL = Below Detection Limit

Referenced Interlaboratory Sr, s = 0.45 CBR = Cannot Be Read, see Table II

IC

Data QA

MEMORANDUM

To: Interested Parties, Building 123

From: M.N. Schluterbusch

Date: March 27, 1998

Subject: Clearance Air Sample Results, West Wing

Five clearance air samples acquired in the west wing of building 123 under regulatory guidance of Colorado Department of Health and Environment Regulation #8 governing asbestos abatement clearance protocols indicate levels below 0.01 fibers per cubic centimeter or 70 structures per square millimeter. As such, this area is clear for normal occupancy and requires no respiratory protection for asbestos fibers.

Please be aware that all standard building operations, protocols and procedures are still in force as directed by building management.

DEMOLITION NOTIFICATION -- Colorado

This form requires 2 signatures and a $55 fee. Incomplete applications will be returned. Questions? Please call 692-3179.

Specify type of materials used in the construction of the building/structure, and amount, in tons:

concrete: 4,500	brick:	steel: 3	wood: 4	other:

DEMOLITION CONTRACTOR:

Denver West Remediation & Construction
Company Name

1819 Denver West Drive-B-26, Ste 200
Street

Golden | CO | 80401
City | State | Zip Code

(303) 966-6598
Phone

DEMOLITION SITE:

West Side of Building 123 &
Buildings 113, 114, 123S | 1952-74
Building Name (if applicable) | Year Built

State Highway 93 & Cactus Ave.
Rocky Flats Environmental Tech Site
Street

Golden | Jefferson | CO | 80401
City | County | Zip Code

Start date: 3/6/98 Completion date: 3/30/98
Proposed demolition start and completion dates

BUILDING OWNER:

United States Department of Energy
Rocky Flats Environmental Tech Site
Name

State Highway 93 & Cactus Ave.
Street

Golden | CO | 80401
City | State | Zip Code

(303) 966 - 7000
Phone

CERTIFIED ASBESTOS INSPECTOR:

Michael N. Schluterbusch
Name (Please print. Note: signature is required at bottom of this form.*)

RFETS - T130I | Golden, CO 80401
Address | City | State | Zip

505-80-5651 | 5/30/98
Colorado Certificate # | Expiration Date

(303) 966-4215 | 3/30/97 + 3/25/98
Phone | Date(s) of inspection

* I certify that I possess current AHERA and state of Colorado certification as an Asbestos Building Inspector. I also certify that I have inspected the building to be demolished, as listed in the Demolition Site block, above, sampled all suspect materials (in accordance with AHERA) and had them analyzed for the presence of asbestos, and to the best of my ability have determined that (☒ appropriate box and sign in pen):

- ☐ no asbestos exists anywhere in the building
- ☑ the only ACM left in the building is VAT and/or tar-impregnated roofing felt
- ☐ all ACM that I found has been completely removed from this building

Asbestos Building Inspector signature: Michael N Schluterbusch

I certify that all refrigerants from air conditioning/refrigeration appliances have been properly recovered in accordance with AQCC Regulation No. 15 (For information on CFC requirements call 692-3177.)

☐ Building Owner or ☐ Contractor

Signature: Date:

Revised 01/97

H:\...\forms\demoapp.doc\011097\1337

RESERVOIRS ENVIRONMENTAL SERVICES, INC.
AIHA Certificate of Accreditation #480, Lab ID 10768

TABLE I. NIOSH 7400 FIBER COUNT ANALYSIS

West side

RES Job Number:	RES 50480-1
Client:	Rocky Mountain Remediation
Client Project:	98D1529
Date Samples Received:	March 27, 1998
Analysis Type:	PCM 7400 A, Air
Turnaround:	2 Hour

Client ID Number	Lab ID Number	Air Volume Sampled (L)	Fields Analyzed	Fiber Count	Fiber Density (F/mm²)	Limit of Detection (F/cc)	Fiber Concentration (F/cc)
123-980327-MS-001	EM 337318	1392	100	3.5	BDL	0.002	BDL
123-980327-MS-002	EM 337319	1349	100	ND	BDL	0.002	BDL
123-980327-MS-003	EM 337320	1209	100	ND	BDL	0.002	BDL
123-980327-MS-004	EM 337321	1246	100	0.5	BDL	0.002	BDL
123-980327-MS-005	EM 337322	1298	100	2.0	BDL	0.002	BDL
123-980327-MS-006	EM 337323	0	100	ND	BDL	----	----
123-980327-MS-007	EM 337324	0	100	ND	BDL	----	----

Field Area = 0.00785 sq mm Filter area = 385 sq mm

Note: Estimated Limit of Detection for 7400 Method is 7 F/sq mm

NA = Not Analyzed ND = None Detected BDL = Below Detection Limit

Referenced Interlaboratory Sr, s = 0.45 CBR = Cannot Be Read, see Table II

IC

Data QA

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
Located in Glendale, Colorado

Laboratory and Radiation Services Division
8100 Lowry Blvd.
Denver CO 80220-6928
(303) 692-3090

http://www.cdphe.state.co.us

Colorado Department of Public Health and Environment

DEMOLITION APPROVAL NOTICE

This approval notice is granted subject to Colorado Air Quality Control Commission Regulation No. 8, Part B, adopted September 19, 1996 and effective November 30, 1996, and the Air Quality Control Act C.R.S. 1982 & 1995 (25-7-101 and 25-7-501 *et seq*). This notice signifies that the structure was inspected for asbestos and CFCs and the demolition contractor has properly notified the Colorado Department of Public Health pursuant to Regulation No. 8, Part B. **THE ORIGINAL APPROVAL NOTICE MUST BE POSTED ON SITE AT ALL TIMES.**

As a contractor, you may have to obtain other demolition licenses and permits, depending on the requirements of the county and municipality in which the work is being performed. The Colorado Department of Public Health, Air Pollution Control Division strongly suggests that you check with county and municipal authorities in order to determine any other local building/permitting requirements that must be met.

This approval notice is valid from **03/09/1998** through **03/15/1998**
The actual scheduled work dates are from **03/09/1998** through **03/15/1998**

This approval notice has been issued to:

DENVER W. REMEDIATION & CONSTR
1819 DENVER W. DR., #26 STE 200
GOLDEN, CO 80401

For the location specified below:

BLDGS 113, 114, 123S, 123
STATE HWY 93 & CACTUS AV
GOLDEN
JEFFERSON COUNTY

Asbestos Building Inspector: MICHAEL N. SCHLUTERBUSCH
State Certification Number: 505-80-5651, Expiration: 02/13/1998
Phone Number: (303) 966-4215
Inspection Date: 03/10/1998

RECEIVED

MAR 30 1998

Denver West Remediation
and Construction, L.L.C.

Approval Issued on: 03/26/1998
Record Number: 1585
Notice Number: 98JE1355D-
Amount Paid: $55
Check Number: 300384

Issued by: ______________________

Immediately notify the Asbestos Unit of project modifications by fax at 782-0278 and the appropriate county health department by fax. Project modifications include changes in the scope of work or the scheduled work dates.

RFP-1325.02 (REV. 3/98)
Previously RF-46522

CORRES. CONTROL
INCOMING LTR NO.

00544 RF 98

DUE DATE

ACTION

DIST.	LTR	ENC
BACON, R.F.		
BENSUSSEN, S.J.		
BORMOLINI, A.M.		
BOYTER, N.C.		
BRAILSFORD, M.D	X	
BURDGE, L		
CARD, R.G.		
COSGROVE, M.M.		
COULTER, W.L.		
CRAWFORD, A.C.		
DERBY, S.		
DIETERLE, S.E.	X	
FERRERA, D.W.	X	
FERRERA, K.P.		
GERMAIN, A.L.		
GILPIN, H.E.		
HARDING, W.A.		
HARROUN, W.P.		
HEDAHL, T.G.		
HILL, J.A.		
MARTINEZ, L.A.		
NORTH, K.		
PARKER, A.	X	
PHILLIPS, F.J.		
RHOADES, D.W.		
RODGERS, A.D.		
SANDLIN, N.B.		
SPEARS, M.S.		
TILLER, R. E.		
TUOR, N.R.		
VOORHEIS, G.M.		
Sproles, A	X	
Boss, K	X	
COR. CONTROL	X	X
ADMN. RECORD		
PATS/T130G		

Reviewed for Addressee
Corres. Control RFP

4/9/98 Date By

Ref Ltr. #

DOE ORDER # 4700.1

9 APR 98 3: 55 RFETS-CC

States Government | Department of

emorandum

Rocky Flats Field

APR 09 1998

AMGO:AMD:SRS:06861

Approval for the Demolition of Buildings 113, 114, 123, and 123S

Marvin Brailsford
Vice President, Safeguards Security, Site Operations and Integration
Kaiser-Hill Company, L.L.C.

After reviewing the requirements of the Department of Energy Order 4300.1C for building 123, submitted February 20, 1997, and the revised 4300.1C requirements for buildings 113, 114, 123S submitted March 13, 1998, the demolition of buildings 113, 114, 123, and 123S is hereby approved.

Steven R. Schiesswohl
Realty Officer

cc:
L. Lewis, AMGO, RFFO
T. Lukow, AMD, RFFO
S. Schiesswohl, AMD, RFFO

DWRC
Denver West Remediation and Construction, L.L.C.
. . . restoring the environment
1819 Denver West Drive
Building 26, Suite 200
Golden, CO 80401
Phone: (303) 215-1103
Fax: (303) 215-1450

April 14, 1998

Mr. Robert Johannes
Colorado Department of Public Health and Environment
4300 Cherry Creek South Drive
Denver, CO 80246

DEMOLITION NOTIFICATION FOR ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE; BUILDING 123 - WEST SIDE AND 113, 114, 123S – 98-DWRC-365

Denver West Remediation and Construction (DWRC) received a Demolition Approval Notice (No. 98JE1355D-) on March 30, 1998, for Buildings 113, 114, 123S, and 123. Per our conversation on April 9, 1998, you indicated that this permit was issued to take care of the west side of Building 123 and the ancillary buildings depicted on the notice.

DWRC is anticipating a release to start demolition on the facility on April 15, 1998. The entire demolition effort is expected to proceed until the end of April. This letter is to inform you of our anticipated dates and forward the attached Demolition Notification for the west side of Building 123 and Buildings 113, 114, and 123S. This letter and form will be attached to the Demolition Approval Notice as documentation.

If you have any questions, please contact me at (303) 966-8082. DWRC will keep you informed of any changes that may occur. Your help is appreciated.

Sincerely,

T.G. Bourgeois

T. G. Bourgeois
Manager, Construction Management

TGB:mmc

cc:
Bengel, Paul
Dorr, Kent
Records

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
http://www.cdphe.state.co.us/hm/

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198

Colorado Department
of Public Health
and Environment

April 22, 1998

Mr. Bill Fitch
Building 123 Project Manager
U.S. Department of Energy
P.O. Box 928
Golden, CO 80402-0928

RE: Building 123 Demolition Plan Approval

Dear Mr. Fitch:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division), has reviewed the *Demolition Plan for Building 123 Demolition Project* (hereafter called the Plan) submitted for the Rocky Flats Environmental Technology Site (RFETS) on February 17, 1998. The Close-Out Radiological Survey Plan for the 123 Cluster has been provided to the Division. Currently, final surveys have been completed for the east-wing of Building 123 and Buildings 114 and 123S. Based on our review of the information provided, all remaining materials and structures within these buildings have met the unrestricted release standards, with the exception of the concrete slab. Contaminated areas within the slab have been sealed with a weather proof epoxy coating and covered with a steel plate. Final surveys for Building 113 and the west-north wing of Building 123 have not been completed. As a result, the Site is not presently able to demonstrate that those remaining structures have met the unrestricted release standards.

Although the sequence of areas to be demolished may have changed, based on our conversations with the Site, the remaining information in the Plan is accurate. The Division hereby approves the Demolition Plan for Building 123 Demolition Project. Although ultimate disposition of the slab is pending, demolition of the surrounding walls and roof can proceed. This approval, however, does not include Building 113 and the west-north wing of Building 123. Once the final radiological survey results have been provided to the Division for review, the Division will make a determination on the information. Once we have completed our review, we will issue our decision as to whether or not the Site can proceed with the demolition of these buildings.

If you have any questions regarding this matter, please contact Chris Gilbreath at (303) 692-3371.

Sincerely,

Steve Tarlton
Steve Tarlton
D&D Project Coordinator

cc: T. Rehder, EPA
S. Gunderson, CDPHE
D. Miller, AGO
K. Dorr, Kaiser-Hill, T-130F

CORRES. CONTROL
OUTGOING LTR. NO.
DOE ORDER #.

RF 02467

DIST.	LTR	ENC
BENSUSSEN, STAN		
BORMOLINI, ANN		
BRAILSFORD, MARV		
BURDGE, LARRY		
CARD, BOB		
HARDING, WYNN		
HILL, JOHN		
MARTINEZ, LEN		
PARKER, ALAN	X	
TUOR, NANCY		
VOORHEIS, GARY		
DORR, KENT	X	
Crowe, Steve	X	
Bruse, Jill	X	
Buhl, Tony		
Daniels, Kevin	X	
Davis, Bob		
Gillen, Bill		
Kautter, Bob		
Leonard, Eric		
Miles, Paul	X	
Miller, John		
Schmalz, Greg	X	
Steelman, Mark		
Walker-Lembke, S.		
Hedahl, Tim	X	
Rodgers, Alan		
M Brian	X	
BOWLES MIKE	X	
BRADFIELD S	X	
PUTNEY M	X	
SCHNER G	X	
CORRES.CONTROL	X	X
ADMIN RECRD/080		
PATS/T130G		

CLASSIFICATION:		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:
Exempt per CEX-266-95

IN REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

OR TYPIST INITIALS:
B :rwa

RF-46469 (Rev. 1/98)

KAISER•HILL
COMPANY

May 8, 1998

98-RF-02467

Keith A. Klein
Deputy Manager for Technical Programs
DOE, RFFO

REQUEST FOR AUTHORIZATION TO COMMENCE DEMOLITION - AMP-085-98

Ref: (a) K.A. Klein ltr, 05078, to A. M. Parker, Environmental Readiness Evaluation, June 30, 1997

Kaiser-Hill (K-H) is submitting written notification to the Office of the Assistant Manager for Environmental Compliance informing DOE that K-H is ready to proceed with the demolition of the remainder of the Building 123 cluster.

In accordance with reference (a), K-H is requesting written notification to commence this work.

If you have any questions on this matter, please contact Jill Bruse at extension 4807 or pager 212-3377.

Alan M Parker

Alan M. Parker
Vice President
Closure Projects Integration

SJB:rwa

Original and 1 cc - K. A. Klein

cc:
Mike Erickson

DOE F 1325.8

United States Government **Department of Energy**

memorandum

Rocky Flats Field Office

DATE: MAY 1 3 1998

REPLY TO ATTN OF: AMEC:ECD:MOE:03365

SUBJECT: Approval to Proceed with Building 123 Demolition

TO: Alan Parker, Vice President
Closure Projects Integration
Kaiser-Hill Company, L. L. C

Your request 'Letter, 98-RF-02467, dtd 5/8/98, subject as above' to commence Building 123 Demolition is approved for the north and west wings. The Rocky Flats Field Office Environmental Readiness Evaluation (ERE) team will continue to monitor the project to ensure that start-up is smooth and that the post-start-up findings are closed.

Keith A. Klein
Deputy Manager for Technical Programs

cc:
E. Kray, CDPHE
R. Warther, DNFSB
T. Weadock, EH-24, HQ
J. Legare, AMEC, RFFO
M. Weis, AMPA, RFFO
D. Lowe, AME, RFFO
B. Fitch, ER/WM, RFFO

Attachment 10

Certificates of Destruction

CERTIFICATE OF DESTRUCTION FOR GOVERNMENT PROPERTY

[redacted]

L000000808

PROPERTY CONTROL NUMBER L000000808

SERIAL NUMBER NA - Building 113

MANUFACTURE NAME NA

MODEL NUMBER Concrete Building

THE FOLLOWING ARE EXCLUSIONS NOT AUTHORIZED FOR DESTRUCTION USING THIS CERTIFICATE

Nuclear Materials: (41 CFR 101-42.1102-4)
Upholstered or Cloth-covered items: (41 CFR 101-42&44.108.5)
Batteries: (41 CFR 42)
Gas Cylinders (41 CFR 101-42.1107-7)
Chemicals: (41 CFR-42.1102-7)
Weapons: (41 CFR 101.309-8)
Safes: (41 CFR 101-42.1102-1)
Software: (41 CFR 101-42)
Flags: (41 CFR 101-45.1&46202)

Destruction of the above must be requested under separate letter to the Dyncorp of Colorado, Inc., Property Administrator

Under the provision of the Federal Acquisition Regulation, Paragraph 45.611 (2) the proeprty described above has been destroyed under contract KH 415278 MC, dated 9/25/97
Task Order 8

VERN GUTHRIE
Print Name and Title of destruction Official

Vern Guthrie
Signature of Property Custodian or Destruction Official

5/18/98
Date

Dorthea L. Hoyt
Print Name and Title of Disinterested Witness

Dorthea L Hoyt
Signature of Disinterested Witness

5/18/98
DATE

M. J. NELSON
Print Name and Title of Property Management

M J Nelson
Signature of Property of Property Administrator

5-18-98
DATE

CERTIFICATE OF DESTRUCTION
FOR
GOVERNMENT PROPERTY

[redacted]

L000000932

PROPERTY CONTROL NUMBER L000000932

SERIAL NUMBER NA - Building 114

MANUFACTURE NAME NA

MODEL NUMBER Masonry Block Shelter

THE FOLLOWING ARE EXCLUSIONS NOT AUTHORIZED FOR DESTRUCTION USING THIS CERTIFICATE

Nuclear Materials: (41 CFR 101-42.1102-4)
Upholstered or Cloth-covered items: (41 CFR 101-42&44.108.5)
Batteries: (41 CFR 42)
Gas Cylinders (41 CFR 101-42.1107-7)
Flags: (41 CFR 101-45.1&46202)
Chemicals: (41 CFR-42.1102-7)
Weapons: (41 CFR 101.309-8)
Safes: (41 CFR 101-42.1102-1)
Software: (41 CFR 101-42)

Destruction of the above must be requested under separate letter to the Dyncorp of Colorado, Inc., Property Administrator

Under the provision of the Federal Acquisition Regulation, Paragraph 45.611 (2) the proeprty described above has been destroyed under contract KH 415278 MC Task Order 8, dated 9/25/97

VERN GUTHRIE
Print Name and Title of destruction Official

[signature]
Signature of Property Custodian or Destruction Official

5/18/98
Date

Dorthea L. Hoyt
Print Name and Title of Disinterested Witness

[signature]
Signature of Disinterested Witness

5/18/98
DATE

M. J. Nelson
Print Name and Title of Property Management

[signature]
Signature of Property of Property Administrator

5-18-98
DATE

CERTIFICATE OF DESTRUCTION FOR GOVERNMENT PROPERTY

[redacted]

L000000451

PROPERTY CONTROL NUMBER L000000451

SERIAL NUMBER NA - Building 123

MANUFACTURE NAME NA

MODEL NUMBER Concrete and Concrete Block Building

THE FOLLOWING ARE EXCLUSIONS NOT AUTHORIZED FOR DESTRUCTION USING THIS CERTIFICATE

Nuclear Materials: (41 CFR 101-42.1102-4)
Upholstered or Cloth-covered items: (41 CFR 101-42&44.108.5)
Batteries: (41 CFR 42)
Gas Cylinders (41 CFR 101-42.1107-7)
Chemicals: (41 CFR-42.1102-7)
Weapons: (41 CFR 101.309-8)
Safes: (41 CFR 101-42.1102-1)
Software: (41 CFR 101-42)
Flags: (41 CFR 101-45.1&46202)

Destruction of the above must be requested under separate letter to the Dyncorp of Colorado, Inc., Property Administrator

Under the provision of the Federal Acquisition Regulation, Paragraph 45.611 (2) the proeprty described above has been destroyed under contract KH 415278 MC, dated 9/25/97
Task Order 8

VERN GUTHRIE
Print Name and Title of destruction Official

[signature]
Signature of Property Custodian or Destruction Official

5/18/98
Date

Dorthea L. Hoyt
Print Name and Title of Disinterested Witness

[signature]
Signature of Disinterested Witness

5/18/98
DATE

M. J. NELSON
Print Name and Title of Property Management

[signature]
Signature of Property of Property Administrator

5-18-98
DATE

[redacted]

L000000807

CERTIFICATE OF DESTRUCTION FOR GOVERNMENT PROPERTY

PROPERTY CONTROL NUMBER L000000807

SERIAL NUMBER NA - Building 123S

MANUFACTURE NAME NA

MODEL NUMBER Sheet Metal Shed

THE FOLLOWING ARE EXCLUSIONS NOT AUTHORIZED FOR DESTRUCTION USING THIS CERTIFICATE

Nuclear Materials: (41 CFR 101-42.1102-4)
Upholstered or Cloth-covered items: (41 CFR 101-42&44.108.5)
Batteries: (41 CFR 42)
Gas Cylinders (41 CFR 101-42.1107-7)
Chemicals: (41 CFR-42.1102-7)
Weapons: (41 CFR 101.309-8)
Safes: (41 CFR 101-42.1102-1)
Software: (41 CFR 101-42)
Flags: (41 CFR 101-45.1&46202)

Destruction of the above must be requested under separate letter to the Dyncorp of Colorado, Inc., Property Administrator

Under the provision of the Federal Acquisition Regulation, Paragraph 45.611 (2) the proeprty described above has been destroyed under contract KH 415278 MC, dated 9/25/97
Task Order 8

VERN GUTHRIE
Print Name and Title of destruction Official

Signature of Property Custodian or Destruction Official — Date 5/18/98

Dorthea L. Hoyt
Print Name and Title of Disinterested Witness

Signature of Disinterested Witness — DATE 5/18/98

M. J. Nelson
Print Name and Title of Property Management

Signature of Property of Property Administrator — DATE 5-18-98

Attachment 11

Soil Sampling and Analysis Plan to Characterize

Individual Hazardous Substance Sites (IHSS) 121 and 148

at

Building 123

Attachment 11
RF/RMRS-98-253.UN

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-023

Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSSs) 121 and 148 at Building 123

INFORMATION ONLY

Rocky Mountain Remediation Services, L. L. C.

REVISION 1

MAY 1998

SOIL SAMPLING AND ANALYSIS PLAN
TO CHARACTERIZE
INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSSs)
121 AND 148
AT BUILDING 123

REVISION 1

MAY 1998

This Sampling and Analysis Plan has been reviewed and approved by:

C. L. Guthrie, RMRS Project Manager	5/11/98 Date
Mark Brooks, RMRS Quality Assurance	5-7-98 Date
John Miller, Radiological Engineering	5-11-98 Date

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS iii

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs) iv

1.0 INTRODUCTION 1

1.1 PURPOSE 1

1.2 BACKGROUND 1

1.2.1 Individual Hazardous Substance Site (IHSS) 121 1
1.2.2 Individual Hazardous Substance Site (IHSS) 148 4
1.2.3 Resource Conservation and Recovery Act (RCRA) Unit 40 6
1.2.4 Potential Areas Of Concern (PACs) 6

1.3 GEOLOGY 8

2.0 SAMPLING RATIONALE 8

3.0 DATA QUALITY OBJECTIVES 9

3.1 STATE THE PROBLEM 9

3.2 IDENTIFY THE DECISION 9

3.2.1 Soils 9
3.2.2 Groundwater 9

3.3 IDENTIFY INPUTS TO THE DECISION 9

3.4 DEFINE THE BOUNDARIES 10

3.5 DECISION RULE 10

3.6 DECISION LIMITS 10

4.0 SAMPLING ACTIVITIES 10

4.1 SAMPLE LOCATION AND FREQUENCY 10

4.2 SAMPLE DESIGNATION 13

4.3 SAMPLE COLLECTION 13

4.4 SAMPLE HANDLING AND ANALYSIS 14

5.0 DATA MANAGEMENT 16

6.0 QUALITY ASSURANCE 16

6.1 QUALITY ASSURANCE PROGRAM 16

6.2 TRAINING REQUIREMENTS 16
6.3 CORRECTIVE ACTION 16
6.4 DOCUMENT CONTROL 17
6.5 RECORDS 17
6.6 CHANGE CONTROL 17
6.7 PROCUREMENT 17
6.8 INSPECTION AND ACCEPTANCE TESTING 17
6.9 MANAGEMENT ASSESSMENTS 17
6.10 INDEPENDENT ASSESSMENT 17
6.11 QUALITY CONTROL 17
6.12 ANALYTICAL DATA 18
6.12.1 Precision 18
6.12.2 Accuracy 18
6.12.3 Representativeness 18
6.12.4 Completeness 18
6.12.5 Comparability 19
7.0 SCHEDULE 19
8.0 ADDITIONAL ACTIVITIES 19
8.1 CLOSURE OF RCRA UNIT 40 19
8.2 DISPOSITION OF WASTE 19
9.0 REFERENCES 20

TABLES

1-2 Constituents Detected above Minimum Detection Levels or Activities in Soil Samples Collected during Surface Soil Survey at IHSS 148 5
4-1 Sampling Requirements 11
4-4 Analytical Requirements for Soil Samples 15

FIGURES

1-1 Building 123 Site Location 2
1-2 Location of Building 123 and Associated IHSSs 121 and 148 3
4-1 Soil Sampling Locations 12

ACRONYMS

ALARA	As Low As Reasonably Achievable
Am	Americium
APO	Analytical Project Office
AR	Administrative Records
ASD	Analytical Services Division
Be	Beryllium
BRCS	Building Radiation Cleanup Standard
BTEX	benzene, toluene, ethylbenzene, and xylenes
$C_2H_4O_2$	acetic acid
CAP	Corrective Action Process
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Cm	curium
DER	Duplicate Error Ratio
DOE	U. S. Department of Energy
DQO	Data Quality Objective
EDD	Electronic Disc Deliverable
EMD	Environmental Management Department
EMSL	Environmental Monitoring Support Laboratory
EPA	U. S. Environmental Protection Agency
ER	Environmental Restoration
FID	Flame Ionization Detector
FIDLER	Field Instrument for the Detection of Low Energy Radiation
FO	Field Operations
GC/MS	Gas Chromatography/Mass Spectrometry
GPS	Global Positioning System
H_2SO_4	sulfuric acid
HCl	hydrochloric acid
$HClO_4$	perchloric acid
HF	hydrofluoric acid
HNO_3	nitric acid
HPGe	high-purity germanium
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Plan
K-H	Kaiser-Hill
LLW	Low-level waste
NaOH	sodium hydroxide
NH_4OH	ammonium hydroxide
OPWL	Original Process Waste Line
OU	Operable Unit
PAC	Potential Area of Contamination
PAM	Proposed Action Memorandum
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	Photo Ionization Detector
PPE	Personal protective equipment
Pu	plutonium
QA/QC	Quality Assurance/Quality Control
QAPD	Quality Assurance Program Description
RCRA	Resource Conservation and Recovery Act

ACRONYMS (cont'd)

SWD	Soil and Water Database
RCT	Radiological Control Technician
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RMRS	Rocky Mountain Remediation Services, L.L.C.
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SOPs	Standard Operating Procedures
TAL	Target Analyte List
TCFM	trichlorofluoromethane
TCL	Target Compound List
TOC	total organic carbon
TSDF	treatment, storage, and disposal facility
U	uranium
UBC	under building contamination
VOC	volatile organic compound

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs)

Identification Number	Procedure Title
2-G32-ER-ADM-08.02	*Evaluation of ERM Data for Usability in Final Reports*
2-S47-ER-ADM-05.15	*Use of Field Logbooks and Forms*
5-21000-OPS-FO.03	*General Equipment Decontamination, Section 5.3.1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field*
5-21000-OPS-FO.06	*Handling of Personal Protective Equipment*
5-21000-OPS-FO.10	*Receiving, Labeling, and Handling Environmental Containers*
5-21000-OPS-FO.13	*Containerization, Preserving, Handling and Shipping of Soil and Water Samples*
5-21000-OPS-FO.15	*Photoionization Detectors and Flame Ionization Detectors*
5-21000-ER-OPS-GT.01	*Logging Alluvial and Bedrock Material*
5-21000-ER-OPS-GT.06	Monitoring Wells and Piezometer Installation
5-21000-ER-OPS-GT.39	*Push Subsurface Soil Sampling*
4-U50-REP-1006	*Radiological Characterization of Bulk or Volume Materials*
RM-06.02	*Records Identification, Generation and Transmittal*
RM-06.04	*Administrative Record Document Identification and Transmittal*

SOIL SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSSs) 121 AND 148 AT BUILDING 123

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of a Sampling and Analysis Plan (SAP) is to characterize the presence or absence of hazardous and/or radioactive contamination in the soil beneath the Building 123 concrete slab, leaks adjacent to selected sumps, process waste lines, and pits, localized spills and the general condition of the surrounding grounds. The goal of the field investigation is to determine the presence of contamination in the soil to support the decontamination and demolition of Building 123 and fulfill criteria defined by the *Proposed Action Memorandum (PAM) for the Decommissioning of Building 123* (RMRS 1997a).

The objective of the SAP is to define specific data needs, sampling and analysis requirements, data handling procedures, and associated Quality Assurance/Quality Control (QA/QC) requirements for this project. All work will be performed in accordance with the Rocky Mountain Remediation Services, L.L.C. (RMRS) Quality Assurance Program Description (QAPD) (RMRS 1997b).

1.2 BACKGROUND

Building 123 is located on Central Avenue between Third and Fourth Streets at the Rocky Flats Environmental Technology Site (RFETS, Figure 1-1). The Building 123 area encompasses overlapping IHSSs 121 and 148 and a portion of RCRA Unit 40 (Figure 1-2).

Four (4) associated Potential Areas of Contamination (PACs), 100-601, 100-602, 100-603, and 100-611 have been identified in the RFETS *Historical Release Report* (HRR, DOE 1992c). The PACs were established as the result of documented spill incidents.

Unconfirmed reports of contaminant spills have been indicated in interviews with building employees. In the late 1960's or early 1970's a cesium-contaminated liquid was spilled on the concrete floor in Room 109C (Figure 1-2). The floor was immediately sealed to immobilize the contamination. No further action was initiated to address consequences of the spill.

1.2.1 IHSS 121

IHSS 121 consists of RCRA Unit 40 underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3, which were designated in the *Final Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan For Operable Unit 9* (DOE 1992a). The area has also been identified as PAC 000-121 in the HRR. The OPWL system constitutes former Operable Unit No. 9 (OU 9) and RCRA Unit 40, the plant-wide process waste system comprised of tank and underground pipelines constructed to transport and temporarily store process wastes from point of origin to on-site treatment and discharge points.

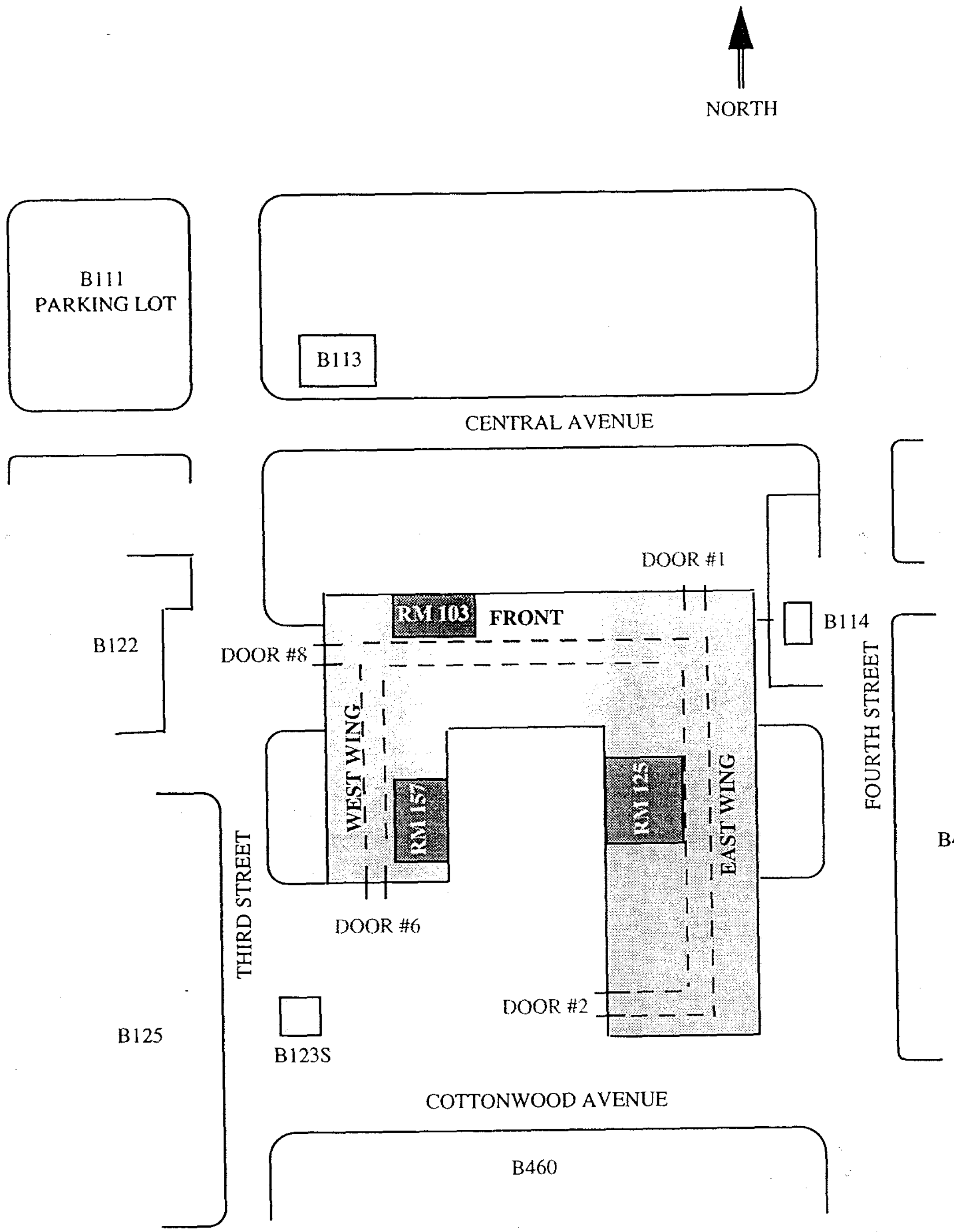

Figure 1-1 Building 123 Site Location

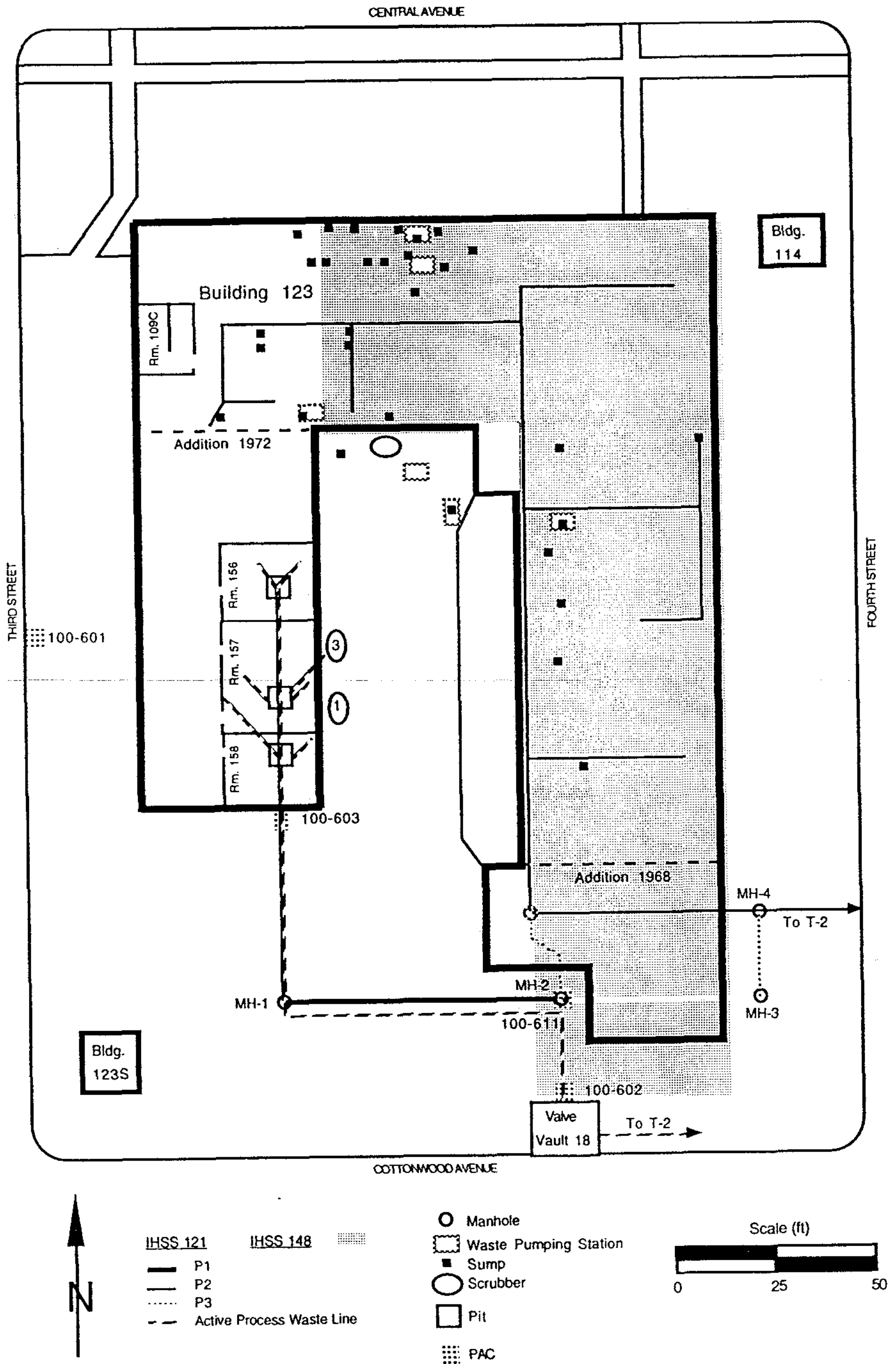

Figure 1-2 Location of Building 123 and Associated IHSSs 121 and 148

All process waste generated from 1952 to 1968 was transferred from Building 123 to Building 441 through line P-2, which ran below the west side of the east wing before exiting at the southeast corner of the building. In 1968 the east wing was extended about fifty (50) feet to the south. Prior to the building addition, two manholes (MH-2 and MH-3, Figure 1-2) were constructed and the line was extended south to MH-2, then east to MH-3, and north to MH-4, before assuming the original path at P-2. The extension was designated as P-3. One manhole was abandoned and covered by the building addition. In 1972, a west wing was constructed, extending south from the northwest corner of the original building. Prior to construction of the wing, line P-1 was installed to transfer waste to manhole MH-1, then east to a junction with P-3 at MH-2 (Figure 1-2). The lines transferred the following process waste from Building 123:

- Acids: nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), and perchloric acid ($HClO_4$);
- Bases: ammonium hydroxide (NH_4OH) and sodium hydroxide (NaOH);
- Solvents: acetone, alcohols, cyclohexane, toluene, xylenes, triisooctomine, and ether;
- Radionuclides: various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm);
- Metals: beryllium (Be) (trace amounts); and
- Others: ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs) (DOE 1992a).

In 1982, P-2 and P-3 were abandoned and plugged with cement. In 1989 the process waste transfer system was upgraded, including removal of the east-west section of P-1 between MH-2 and MH-3. The north-south section of P-1 between Building 123 and MH-1 was converted to the new process system. Three large, interconnected concrete sump pit areas were installed in Rooms 156, 157, and 158 to accommodate process waste system backup. Pipe was installed connecting MH-1 to Valve Vault 18. A second building addition was also made to the south end of the east wing, partially overlying line P-3 (Figure 1-2).

Currently, all process waste throughout Building 123 is collected in floor sumps. Each sump collects and temporarily stores liquid waste which is then pumped through overhead lines into a main floor sump in Room 158. The waste is then gravity-fed through P-1 to Valve Vault 18, then to underground Tank T-2 (Tank 853) at Building 428, and finally to Building 374 for treatment (Figure 1-2).

1.2.2 IHSS 148

A detailed characterization of former Operable Unit No. 13 (OU 13) was conducted from September 1993 to February 1995 as part of a Phase I RCRA RFI/RI. The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys. The investigation identified an area of reported small spills of nitrate-bearing wastes along the east side of Building 123 and a potential for soil contamination beneath the building due to possible leaks in OPWL P-2. The area was established as IHSS 148 and detailed in the *Final Phase I RFI/RI Work Plan for Operable Unit 13* (DOE 1992b). The area has also been identified as Under Building Contamination (UBC) 123 and PAC 100-148 in the HRR.

Thirty-four (34) analytes were detected in the surface soil survey, including twenty-six (26) inorganic compounds and eight (8) radionuclides. Eleven (11) analytes exceeded background limits at a minimum of one sample location throughout IHSS 148. Constituents that exceeded minimum detection levels or activities are indicated in Table 1-2.

Table 1-2 Constituents Detected above Minimum Detection Levels or Activities in Soil Samples Collected during Surface Soil Survey at IHSS 148

Constituents Detected Above Minimum Detection Levels or Activities	Maximum Concentration	Background Limits[a]	Tier II Soil Action Levels[b]
Chromium	95.6 mg/kg [c]	24.9 mg/kg [c]	4860 mg/kg [d]
Cobalt	28.7 mg/kg	24.8 mg/kg	123,000 mg/kg
Copper	43.4 mg/kg	27.3 mg/kg	81,800 mg/kg
Lead	165 mg kg	61.4 mg/kg	1000 mg/kg
Nickel	52.4 mg/kg	26.8 mg/kg	40,900 mg/kg
Strontium	94.7 mg/kg	90.1 mg/kg	>1,000,000 mg/kg
Zinc	1,220 mg/kg	86.6 mg/kg	>1,000,000 mg/kg
Americium^{-241}	0.197 ± 0.032 pCi/g	0.0227 pCi/g	38 pCi/g
Plutonium$^{-239/-240}$	0.169 ± 0.04 pCi/g	0.066 pCi/g	252 pCi/g
Uranium$^{-233/-234}$	2.04 ± 0.396 pCi/g	2.253 pCi/g	307 pCi/g
Uranium^{-238}	2.14 ± 0.309 pCi/g	2.00 pCi/g	103 pCi/g

[a] Source: DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program,* May.
[b] Source: DOE 1996, *Final Rocky Flats Cleanup Agreement*, July. Metal analyte action levels are based on office worker exposure to soil; radionuclide action levels are based on annual dose limits.
[c] Result indicates total chromium (chromium III + chromium VI).
[d] Result indicates chromium VI only. Action level for chromium III is >1,000,000 mg/kg.

The soil-gas survey was conducted on a 25-foot grid in accordance with the 0413 RFI/RF (DOE 1992b) work plan. Samples were analyzed in the field using Gas Chromatography Mass Spectrometry (GC/MS). Sixty-four (64) soil-gas locations were sampled during the survey. Thirteen (13) samples contained volatile organic compound (VOC) levels in excess of the 1 µg/ L method detection limit. Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the east and west wings of the building. Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2.6 µg/ L. Tetrachloroethene (PCE) was detected at 1.5 µg/ L in a sample collected to the east of Building 123. The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate. Analyses results indicate that subsurface infiltration precluded full evaporation.

1.2.3 Resource Conservation and Recovery Act (RCRA) Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, which includes all active overhead and underground and process waste lines in and around Building 123. No other RCRA unit exists within the Building 123 area. A plan for partial closure of RCRA Unit 40 will be written to characterize and manage all active OPWLs associated with Building 123, as all abandoned lines were properly decommissioned prior to implementation of RCRA regulations.

1.2.4 Potential Areas of Contamination (PACs)

PACs 100-601, 100-602, 100-603, and 100-611 were identified in the HRR, and involve potential impact to the soils surrounding Building 123. All of the four (4) PACs are located in Figure 1-2. The following outlines the nature of each PAC by describing the occurrence, constituents released, and response to the occurrence.

PAC 100-601, Phosphoric Acid Spill

On April 13, 1989, two five-gallon plastic containers of phosphoric acid, which were among other containers of waste chemicals awaiting disposal in a storage cabinet outside of Building 123, deteriorated and leaked a portion of the contents onto the paved ground surface. Approximately one gallon of 1, 2 ethylhexyl phosphoric acid leaked from the containers. At the time the release was detected, approximately eight ounces of the liquid were present on the ground within the vicinity of the cabinet. The spill was contained and the remaining liquid was properly disposed. No further action was required to address consequences of the spill.

PAC 100-602, Process Waste Line Break

On April 13, 1989, Valve Vault 17, located on Cottonwood Avenue between Building 443 and 444, was found to be flooded with approximately 1,200 gallons of aqueous waste. Subsequent investigation indicated that the source of the waste was a break in the active portion of P-1 in manhole MH-1 (Figure 1-2). Leakage from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (i.e., soils) or a PVC electrical conduit. The release also migrated into a section of the OPWL network. Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, five days after the initial detection of release at Valve Vault 17. The potentially affected area includes the active process waste line between MH-2 and Valve Vault 18; the process waste line between Valve Vault 18 and Valve Vault 17, soils surrounding Valve Vault 18 and Valve Vault 17, and OPWL P-3 between MH-2 and MH-3. In July 1989, groundwater containing blue dye used several months earlier to trace the release was observed seeping into excavations around Valve Vault 18.

The release consisted of Building 123 process waste. An estimate was made of types and quantities of materials released to the environment during the five-day period between detection of the release and diversion of Building 123 wastes from the broken line. The estimate was based on typical daily quantities of wastes discharged from Building 123.

- 25 gallons urine;
- 12.5 gallons nitric acid (concentration unknown);
- 20 gallons hydrochloric acid (concentration unknown);
- 1.5 lbs. ammonium thiocyanate;
- 1.0 lbs. ammonium iodide; and
- 2.5 lbs. ammonium hydroxide (concentration unknown).

The above wastes would have been diluted in approximately 2,000 gallons of tap water.

Minor amounts of naturally-occurring uranium were detected in soil and water samples collected after the release. Alpha activity up to 140 pCi/L was recorded in samples of the waste from Valve Vault 17. One water sample from MH-2 also contained eight percent ethylene glycol. Soil sampling was conducted to determine the source and extent of the release (See Section 1.2.2). A temporary surface line was installed, and a replacement underground line was installed in 1989 as part of the process line upgrades. Since the affected areas were located near existing IHSSs scheduled for investigation and remediation activities, no cleanup was initiated. Water and soil samples collected for several weeks after the release indicated that contamination levels (nitrates, chlorides and pH) decreased steadily after the broken line was bypassed.

PAC 100-603, Bioassay Waste Spill

On June 9, 1989, OPWL P-1 was under excavation and replacement due to a break in the line (PAC 100-602). The excavated end of the broken line as temporarily capped with a plastic bag, and Building 123 process waste was rerouted to bypass the broken line. A pump used to reroute the waste failed and allowed the waste to overflow into the broken line. A portion of the waste leaked around the plastic bag and into the excavation. The release was confined to the excavation.

The release consisted of bioassay waste containing hydrochloric acid and nitric acid. The waste exhibited a pH of approximately 1. The waste may also have contained urine, and up to a combined total of 1.5 gallons of ammonium thiocyanate, ammonium iodide and ammonium hydroxide. The estimated maximum volume of the spill was 30 gallons. The released material commingled with rainwater in the excavation.

Potential flow from the excavation was contained with earthen berms. Approximately 100 gallons of rainwater contaminated by the spill were neutralized, pumped from the excavation, and transferred to the process system for treatment in Building 374. Samples were collected to evaluate the spread of contamination. Results indicated that contamination was restricted to the excavation within eight feet of Building 123. No further action has been initiated.

PAC 100-611, Building 123 Scrubber Solution Spill

On November 7, 1989, an inoperative pump in the Building 123 process waste transfer system caused the Building 123 Scrubbers 1 and 3 to overflow, spill scrubbing solution into a bermed area outside of the building and into three sump pits in Rooms 156, 157, and 158 (Figure 1-2). All of the spilled solution was contained within secondary containment structures, and none of the solution was believed to have impacted the environment. The pits were pumped out and the concrete liners properly sealed. The transfer pump failure was determined to be the result of blockage caused by glass filtering wool.

The scrubbing solution consisted primarily of water and was used to scrub acids and salts used in Building 123. Approximately 50 gallons were released to the bermed area, and several hundred gallons were contained in the three sump pits. Analysis indicated that the solution contained in the bermed area exhibited a pH of 1.6; the solution in the three pits indicated a pH of 6.0. All spilled materials were contained and transferred into the Building 123 process waste transfer for eventual treatment at Building 374.

1.3 GEOLOGY

The local geologic setting includes an industrial area that has been gradually developed. The natural soils have been disturbed and replaced by fill during installation of the OPWLs and covered by pavement and structures including Building 123. The soils, fill, pavement, and structures are underlain by Rocky Flats Alluvium which averages about 38 feet in thickness and is composed of poorly to moderately sorted clay, silt, sand, and gravel. The Cretaceous Arapahoe Formation underlies the superficial material and is mainly claystone and silty claystone with sandstone bodies present. Groundwater exists below the site at a depth of approximately 12-17 feet and flows in a generally eastward direction.

2.0 SAMPLING RATIONALE

Historical information detailed in Section 1.2 provides general indications of the types of compounds anticipated at each IHSS, and was used to develop a systematic sampling strategy for this investigation. The sampling rationale is based on historical data. Sample points were selected at biased locations and randomly at other areas. Preliminary sampling will be restricted to soils underlying and surrounding Building 123.

The following conditions were considered in the development of the sampling strategy:

- The operating history of Building 123 suggests that contaminants may have been released into the environment;
- The physical and chemical properties of the contaminants suggest a chronic presence if released into the environment; and
- Historical data indicate the presence of contaminants in quantities above the maximum background concentrations defined by Site Procedure 4-U50-REP-1006, *Radiological Characterization of Bulk or Volume Materials* and the *Background Geochemical Characterization Report* (DOE 1993).

The conceptual models of contaminant migration involve percolation downward through the vadose zone (generally less than 10 feet thick) to the water table. The groundwater flow in this area is predominantly to the northeast. Contaminants may volatilize or biodegrade before reaching the shallowest groundwater zone. Contaminant concentrations are also reduced by dispersion during migration through the porous Rocky Flats Alluvium. Paved portions of the Building 123 area provide an additional impedance to contaminant migration, as precipitation is diverted to the storm water drainage system instead of percolating through the ground surface (DOE 1992b).

3.0 DATA QUALITY OBJECTIVES (DQOs)

The U. S. Environmental Protection Agency (EPA) has established a process to direct Superfund decision-making as the basis for developing DQOs. DQOs are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. Data requirements to support this project were developed and are implemented in the project using criteria established in *Guidance for the Data Quality Objective Process*, QA/G-4 (EPA 1994).

The data quality objective process consists of seven steps and is designed to be iterative; the outputs of one step may influence prior steps and cause them to be refined. Each of the seven steps are described below for the investigative area in Figure 4-1. The data collected from this investigation will be compared to the Tiers I and II action levels of the Rocky Flats Cleanup Agreement Action Levels and Standards Framework for Surface Water, Groundwater and Soil to determine if remediation is necessary for the Site.

3.1 STATE THE PROBLEM

Previous investigations of the Site have identified various types of contamination that have either spilled the soil or leaked from various process lines and/or sumps. The purpose of this investigation is to determine the presence or absence of hazardous and/or radioactive contamination in the soil and impacting groundwater beneath the Building 123 concrete slab, leaks adjacent to selected sumps, process waste lines, and pits, localized spills and the general condition of the surrounding grounds.

3.2 IDENTIFY THE DECISION

3.2.1 Soils

Decisions required to be made using the data collected for subsurface soils include:

- Do activities of radiological contaminants in soil along process waste lines, sumps and pits exceed the RFCA Action Levels?
- Do VOCs, semi-VOCs, metals, PCBs, Total Organic Compounds and nitrate exceed the RFCA Action Levels?

3.2.1 Groundwater

Decisions required to be made using data collected for contaminants impacting groundwater include:

- Do contaminants of concern impact groundwater above the RFCA Action Levels?

NOTE: An independent groundwater SAP will be developed by Environmental Restoration (ER) to evaluate the impact, if any, to groundwater in the Upper Hydro-Stratigraphic Unit Alluvial materials and is not within the scope of this SAP. However, this data along with the soil sampling data will be used by ER to evaluate and rank IHSSs 121 and 148.

3.3 IDENTIFY INPUTS TO THE DECISION

Inputs to the decision include radiochemical and chemical results from subsurface soil and groundwater samples for comparison to RFCA Action Levels. Analysis will be performed as outlined in Table 4-4.

3.4 DEFINE THE BOUNDARIES

The investigative boundaries and rationale are detailed in Section 4 of this SAP.

3.5 DECISION RULE

If the radiochemical activities or chemical concentrations in the subsurface soil exceed RFCA Action Levels for subsurface soil and groundwater, an evaluation, remedial action or management action is required.

3.6 DECISION LIMITS

Decision on further investigation will be based on Environmental Restoration Ranking and additional characterization, if required, will be based upon the analytical results. The sample locations were based on previous investigations, spills identified in the HRR, and the location of OPWLs and RCRA process lines. Groundwater monitoring will be performed in accordance with the RFETS Integrated Monitoring Plan (DOE 1997d).

4.0 SAMPLING ACTIVITIES

4.1 Sample Location and Frequency

The sampling event will focus on the soils underlying and surrounding Building 123 as indicated in Figure 4-1. Subsurface soils will be sampled to a total depth of six (6) feet as described in Section 4.3, as historical data indicates that the presence of contaminants below this depth is unlikely (DOE 1992b). However, evaluation of sample analyses results may indicate a potential for groundwater contamination.

Forty-six (46) locations will be sampled: six (6) will be collected immediately beneath the building slab at a depth of approximately one foot; twenty (20) will be located underneath the building slab at a depth of approximately six feet; and twenty-two (22) will be located in areas surrounding Building 123 (Figure 4-1). Locations were determined with respect to underground OPWLs and paved and unpaved areas. The investigation will focus on the following areas:

- Unpaved areas along the east side of Building 123, to further characterize potential areas of volatile organic constituent contamination;
- Underground OPWLs beneath and to the south of Building 123;
- Points at which the overhead waste process lines enter the subsurface at the south end of the west wing of Building 123;
- PACs;
- Locations of process waste sumps, waste pumping stations, and OPWL junctions and elbows.
- Random samples will be used to characterize the remainder of the Building 123 area. West side) According to *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area* (DOE 1992) and personnel interviews, no contaminant spills or leaks have been reported in these areas, therefore, boreholes will be drilled at 50 foot intervals along the west boundary of the building.

Table 4-1 Sampling Requirements

Area of Concern	Reason	# of Samples	Depth/Interval
Unpaved Areas	Potential VOC contamination	3	6 feet
OPWLS	Potential contamination	14	6 feet
Underground Process waste lines	Potential contamination	3	1 foot
PACs	Potential contamination	3	6 feet
Sumps, pump stations, junctions, elbows	Potential contamination	10 3	6 feet 1 foot
Random sampling (west side)		10	6 feet

Soil sample will be collected at each location, which will consist of one VOC grab sample and the remaining samples will be a composite of the entire core. Figure 4-1 indicates total depths of each core. Locations outside of Building 123 will be sampled to a total depth of six (6) feet. Locations within the Building 123 perimeter near waste pumping stations, sumps, and junctions will also be sampled to a depth of six (6) feet, as building as-built drawings indicate that the pipelines exist at a maximum depth of five (5) feet, and leaks associated with underground lines characteristically migrate downward. All remaining locations will be sampled immediately beneath the building slab (approximately one foot below slab surface) in areas near sumps and sites of historical spills to address potential migration of the process wastes through concrete.

Surface soil sampling will not be performed under this scope of work. However, surface water will be collected as runoff from the site at sampling locations along Central Avenue and will be monitored under the Integrated Monitoring Plan (IMP).

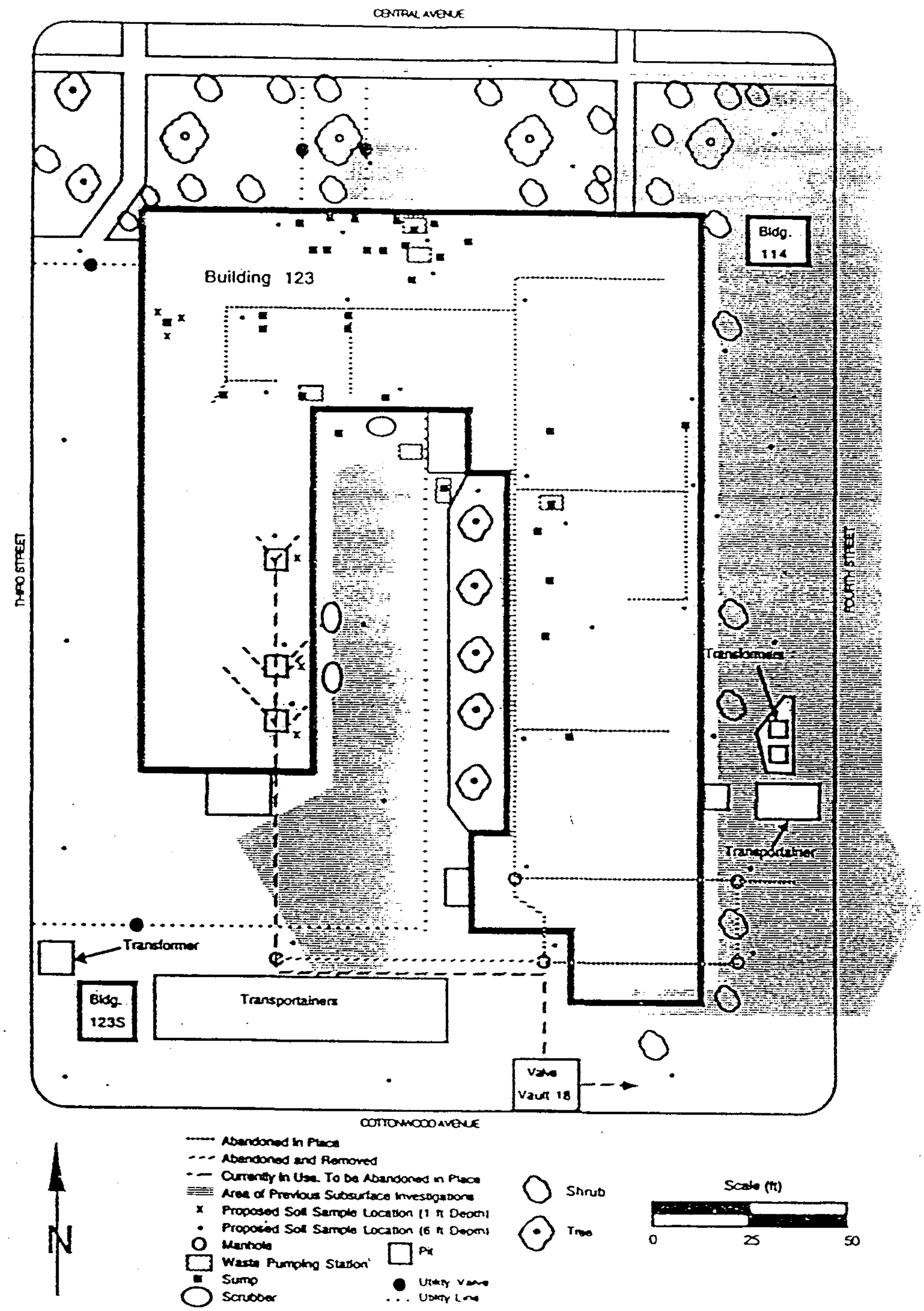

Figure 4-1 Soil Sampling Locations

4.2 SAMPLE DESIGNATION

The site standard sample numbering system will be implemented in this project. A simple, unique, alphanumeric location code will be assigned to each sample while in the field. Prior to sample collection, each sample location will be established using tape and compass. Sample locations outside Building 123 will be marked with a reference flag or stake; locations on the building slab will be marked with fluorescent spray paint. Sample numbers (i.e., 98A000X.00X.00X) will be assigned to the project by the Analytical Services Division (ASD). In preparation of the final report, a matrix will be developed to correlate the individual sample numbers to location codes.

4.3 SAMPLE COLLECTION

Sample depths will be reached using a Geoprobe© truck-mounted hydraulic ram in accordance with Site Procedure 5-21000-ER-OPS-GT.39, *Push Subsurface Soil Sampling.* Soil cores will be recovered continuously in two-foot increments using a 1-inch diameter by 24-inch long stainless steel-lined California core barrel. Recovered soil will be placed into a stainless steel bucket until the desired depth is reached, at which time the soil will be composited by hand using a stainless steel trowel. However, VOC samples will be collected as grab samples and not composited. Cores will be monitored with a Flame Ionization Detector (FID) or a Photoionization Detector (PID) in accordance with Site Procedure 5-21000-OPS-FO.15, *Photoionization Detectors and Flame Ionization Detectors* for health and safety purposes.

Locations beneath the building slab will be sampled by coring through the slab with a hand-held, rotary-type concrete corer to access the underlying soils. The procedures used for coring are outlined in RF/RMRS-97-125.UN, *Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab.* This procedure will be modified to describe sampling through the slab prior to sampling activities taking place. Resulting holes will be properly back-filled with granular bentonite.

A Radiological Control Technician (RCT) will scan each sample with a Field Instrument for the Detection of Low Energy Radiation (FIDLER). Equipment will also be monitored for radiological contamination during sampling activities. All sampling equipment will be decontaminated with an alconox solution, and rinsed with deionized water, in accordance with Environmental Management Department (EMD) Operating Procedure 5-21000-OPS-FO.03, *General Equipment Decontamination, Section 5.3.1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field*. All other sampling equipment will include standard items such as chain of custody seals and forms, logbooks, etc. The cores will be visibly inspected for signs of contaminant staining, then visually logged by the field geologist as per Site Procedure 5-21000-ER-OPS-GT.01, *Logging Alluvial and Bedrock Material*. Additional samples will be collected if cores exhibit visible evidence (staining, odors, etc.) of contamination at shallower depths.

Three (3) field duplicates will be collected to represent at least 5% of the sample batch to provide adequate information on sample variability, as defined in *Guidance for Data Quality Objectives Process* (EPA 1994).

Sample points will be surveyed for location and elevation using Global Positioning System (GPS) equipment to ensure accuracy in data plotting.

Health and safety requirements will be specified in an addendum to the *Building 123 Decommissioning Project Health and Safety Plan* (RF/RMRS-97-022). Personal protective equipment (PPE) and air monitoring requirements, and hazard assessments not otherwise defined in the Building 123 PAM will be addressed in the addendum.

4.4 Sample Handling and Analysis

Samples will be handled according to *Environmental Management Department (EMD) Operating Procedures Volume/ Field Operations*, OPS-FO.13, *Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*, and OPS-FO.10, *Receiving, Labeling, and Handling of Environmental Containers.*

Table 4-4 indicates analytical requirements. Samples will be submitted to an offsite, EPA-approved laboratory for analysis under a 30-day result turnaround time.

Table 4-4 Analytical Requirements for Soil Samples

Analysis	Medium	Number of Samples	EPA Method	Container	Preservation	Holding Time
Target Analyte List (TAL) Metals	Soil	46 samples 3 duplicates 3 rinsates	EPA 6010	1 (one) 250 ml wide-mouth glass jar	Cool, 4° C	180 Days
Target Compound List (TCL) Volatiles	Soil	46 samples 3 duplicates 3 rinsates	EPA 8260A	2 (two) 125 ml wide-mouth glass teflon-lined jar	Cool, 4° C	7 days
TCL Semi-Volatiles	Soil	46 samples 3 duplicates 3 rinsates	EPA 8270B	1 (one) 250 ml wide-mouth teflon-lined jar	Cool, 4° C	7 days until extraction, 40 days after extraction
Total Organic Carbon (TOC)	Soil	46 samples 3 duplicates 3 rinsates	EPA 415.1	1 (one) 250 ml wide-mouth teflon-lined jar	Cool, 4° C	7 days until extraction, 40 days after extraction
Nitrates	Soil	46 samples 3 duplicates 3 rinsates	EPA 300 Methods	1 (one) 250 ml glass jar	Cool, 4° C	2 days
Gross Alpha/Gross Beta	Soil	46 samples 3 duplicates 3 rinsates	EPA 9310	1 (one) 100 ml glass jar	Cool, 4° C	180 days
Isotopics ($U^{233/234}$, U^{235}, U^{238}, Am^{241}, $Pu^{239/240}$)	Soil	46 samples 3 duplicates 3 rinsates	NA[a]	1 (one) 250 ml glass jar	None	180 days
Gamma Spectroscopy	Soil	46 samples 3 duplicates 3 rinsates	NA[a]	1 (one) 250 ml glass jar	None	180 days

[a] No EPA-approved method is currently in place for isotopics analysis. However, guidance is provided in procedures defined in Environmental Monitoring Support Laboratory (EMSL)-LV 0539-17, *Radiological and Chemical Analytical Procedures for Analysis of Environmental Samples*, March 1979.

5.0 DATA MANAGEMENT

A project field logbook will be created and maintained by the project manager or designee in accordance with Site Procedure 2-S47-ER-ADM-05.15, *Use of Field Logbooks and Forms*. The logbook will include time and date of all field activities, sketch maps of sample locations, or any additional information not specifically required by the SAP. The originator will legibly sign and date each completed original hard copy of data. A peer reviewer will examine each completed original hard copy of data. Any modifications will be indicated in ink, and initialed and dated by the reviewer. Logbooks will be controlled through Document Control.

Data for this project will be received from the laboratories in an Electronic Disc Deliverable (EDD) and archived in the Soil and Water Database (SWD). This information will be provided to Kaiser-Hill (K-H) Analytical Services Division (ASD) and the SWD will be identified as the "Owner "of the data in the K-H database. Analytical results will be compiled into a sampling and analysis report.

6.0 QUALITY ASSURANCE

Analytical data collected during this sampling and analysis will be evaluated using the guidance established by the Rocky Flats Administrative Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for Usability in Final Reports*. This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters. Data validation will be performed according to the RFETS Analytical Project Office (APO), Analytical Services Performance Assurance Group procedures, but will be done after the data is used for its intended purpose. Analytical laboratories supporting this task have all passed regular laboratory audits by the APO.

6.1 QUALITY ASSURANCE PROGRAM

The RMRS Quality Assurance Program describes how RMRS implements the requirements of 10 CFR 830.120 through the RFETS site QA Program. Project specific organizational responsibilities must be identified.

6.2 TRAINING REQUIREMENTS

Training requirements for this project must be identified in a Training Implementation Matrix. Additional training identified will be documented through 1-31000-COOP-01 required reading Conduct of Operations and 1-31000-COOP 011, *Pre-Evolution Briefing.*

6.3 CORRECTIVE ACTION

The site Corrective Action Process (CAP) and the RMRS QA-3.1, Corrective Action procedure and the occurrence reporting systems shall be utilized to handle items, services and processes not conforming to established requirements.

6.4 DOCUMENT CONTROL

All documents must be prepared, reviewed and approved in accordance with RMRS DC-06.01, Document Control Program. If the activity is considered a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action, all Administrative Records (AR) generated shall be identified, handled and submitted in accordance with the RMRS Administrative Record Document Identification and Transmittal (RM-06.04) Procedure. All non-AR records shall be handled in accordance with the RMRS Records Identification, Generation and Transmittal (RM-06.02) Procedure. All activities described in project documents shall be conducted in accordance with approved and controlled instructions and procedures identified in project specific documents.

6.5 RECORDS

Records generated for this project will be managed in accordance to the RMRS procedure RM-06.02, *Records Identification, Generation, and Transmittal.* Documentation will be entered into the Administrative Record in accordance with the RMRS Procedure RM-06.04, *Administrative Record Document Identification and Transmittal.*

6.6 CHANGE CONTROL

Design activities are conducted in accordance with the Site's Configuration Change Control Program and the Integrated Work Control Program, 1-454000-CSM-001. Activities are also conducted in accordance with the RMRS Conduct of Engineering Manual (COEM).

6.7 PROCUREMENT

Procurement activities are conducted in accordance the Site Procedure, 1-W36-APR-111, Acquisition Procedure for Requisitioning Commodities and Services and the RMRS QAPD.

6.8 INSPECTION AND ACCEPTANCE TESTING

Inspection and Acceptance Testing is conducted in accordance with Site Procedures 1-D23-QAP-10.02, *Inspection* 1-31000-COOP 019, *Returning Systems and Equipment to Service*, 1-V51-COEM-DES-210, *Design Process Requirements* and 1-I97-ADM-12.01, *Control of Measuring and Test Equipment.*

6.9 MANAGEMENT ASSESSMENTS

Management Assessments are conducted in accordance with the RMRS QA, 9.01, RMRS Management Assessments.

6.10 INDEPENDENT ASSESSMENTS

RMRS Independent Assessments are conducted in accordance with RMRS, QA-10.01, Independent Assessment and RMRS WI, QA-10.01, *Conduct of Surveillances.*

6.11 QUALITY CONTROL (QC)

The following QC sampling requirements will be used as necessary on this project:

QC samples will be collected as part of the characterization at a frequency of 1 in 20 samples. The following types of QC samples will be collected to support characterization:

Duplicates: Duplicate (collocated) samples will be collected in the same manner and analyzed by the same analytical methods, in the same laboratory as the regular samples. These samples will be submitted blind to the laboratory. All duplicate samples will be collected using the same sampling equipment used for collection of the regular samples. Sampling equipment will be decontaminated while collecting regular and QC samples from the same location.

Equipment Rinsate Blanks: Will be prepared by collecting distilled water, poured over decontaminated sampling equipment, between collection of regular samples and collected only when sampling equipment is used. If equipment rinsate blanks will not be collected, all detections of COCs will be considered real and not attributable to cross contamination.

6.12 ANALYTICAL DATA

Analytical data collected in support of the IHSS 121 and 148 soil sampling project will be evaluated using the guidance established by the Rocky Flats Administrative Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for Usability in Final Reports*. This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters. Data validation will be performed according to the RFETS APO, Analytical Services Performance Assurance Group procedures, but will be done after he data is used for its intended purpose.

6.12.1 Precision

Precision is a quantitative measure of variability that is evaluated by comparing analytical results for real samples to analytical results for corresponding duplicate samples. Analytical precision for a singe analyte is expressed as the Relative Percent Difference(RPD) between results of duplicate samples (and matrix spike duplicates) for a given analyte. RPDs indicate the degree of reproducibility of both the sampling and analysis methods. The precision criteria for these samples are specified in the respective methods. For precision, the typical relative percent difference between samples and duplicates is less than or equal to 40% for soil. Duplicates comprise at least 5% of the total sample batch. For radiological analysis precision needs to be less than 1. 42 Duplicate Error Ratio (DER).

6.12.2 Accuracy

Accuracy is a measure of the closeness of a reported concentration to the true value. Analytical accuracy is expressed as percent recovery of a spike of a known concentration that has been added to an environmental sample before analysis. The QC criterion for acceptable percent recovery is 80 percent to 120 percent for all analytes in all media. Accuracy is the responsibility of the laboratory.

6.12.3 Representativeness

Representativeness is a qualitative measure of data quality defined by the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or in this case, an environmental condition. Representativeness is ensured through the careful development and review of the sampling strategy outline in the SAP and SOPs for sample collection, analysis and field data collection.

6.12.4 Completeness

Completeness (90% of valid data) will be evaluated by comparing the SAP to the actual sampling episode. The expected percentage of characterization data validation required for the project is 25 percent.

6.12.5 Comparability

Comparability will be evaluated by comparing historical data with data collected during this event and will be followed in accordance to EPA regulations and Waste Acceptance Criteria, through which data will be validated.

7.0 SCHEDULE

Sample collection and analyses will be conducted in two phases. Phase I will involve collection of twenty-four (24) samples outside of Building 123, and two (2) field duplicates; Phase II will involve collection of twenty-six (26) samples within and beneath the Building 123 slab, and two (2) field duplicates. Phase I sample results may warrant changes in Phase II sample location and frequency, at which time the SAP will be amended to accommodate such changes.

8.0 ADDITIONAL ACTIVITIES

8.1 CLOSURE OF RCRA UNIT 40

The Building 123 slab will remain in place following completion of demolition activities. Proper closure of underground, active lines will be contingent upon rinsate and soil sampling analyses results for constituents listed in Table 4-4. In the event that no contamination above Tier II action levels (RFCA, Appendix 6) is detected, the lines will be remediated in accordance with the Closure Plan. All surface openings to active lines will be capped with a plug of non-shrinking bentonite slurry, and the lines will be abandoned in place under the RCRA Unit 40 Closure Plan. Such an action will be considered a RCRA stable configuration in accordance with the Site Part B Operating Permit.

8.2 DISPOSITION OF WASTE

Remediation and closure activities including IHSS soil sampling may generate a combination of radioactive, hazardous and mixed wastes. Contaminated soil and pipeline material are expected to be the major sources of waste. Wastes consisting of plastic, tools, PPE, and other materials associated with remediation will also be a major source of waste. Following remediation activities, the RFETS Building Radiation Cleanup Standard (BRCS) will be utilized to determine if residual radioactive constituents contained in remaining equipment and remediation debris is compliant with RFCA guidelines and appropriate as-low-as-reasonably-achievable (ALARA) considerations. The BRCS is currently under development in coordination with the EPA, Colorado Department of Public Health and the Environment (CDPHE), and U. S. Department of Energy (DOE). Until the BRCS is approved, more conservative criteria defined in DOE Order 5400.5 and associated RFETS radiation protection procedures will be used to manage debris generated by remedial activities. Contaminated waste will be handled by qualified waste packaging technicians who will support decontamination specialists and radiation control technicians to identify and segregate hazardous or low level waste. Drums or boxes will be provided by the Waste Disposal group. Waste packaging technicians will package and label the waste and arrange for radioactive waste to be certified by the Waste Certification group. The Project Waste Coordinator will work with the certification personnel and prepare all required documentation. Liquid waste generated during decontamination of sampling and associated equipment will be collected in drums and shipped to Building 374 for processing. Solid waste will be managed by the Waste Disposal group and moved to a temporary staging area immediately adjacent to the site to be placed in roll-off containers until proper disposition is determined. Non-radioactively contaminated soil and pipeline material above RCRA hazardous waste regulatory levels will ultimately be disposed of offsite by Chemical Waste Management or other approved treatment, storage, and disposal facilities (TSDFs) as RCRA hazardous waste. RCRA mixed waste consisting of contaminated soils and pipeline material will be disposed of offsite at Envirocare, Utah or at other approved TSDFs.

Low-level radioactive waste (LLW) will be disposed of at the Nevada Test Site or other approved LLW facilities. Non-hazardous, non-radioactive industrial waste will be disposed of at an offsite landfill.

9.0 REFERENCES

DOE 1992a, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Original Process Waste Lines*, March.

DOE 1992b, *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area*, October.

DOE 1992c, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO.

DOE 1997d, *RFETS, Integrated Monitoring Plan*, June.

DOE 1993, *Background Geochemical Characterization Report*, September.

DOE 1994, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Technical Memorandum No. 1, Volume IIA-Pipelines*, November.

DOE 1996, *Rocky Flats Cleanup Agreement, Final*, July.

EPA 1994, *Guidance for Data Quality Objectives Process*, EPA QA/G-4, September.

RMRS 1997a, *Proposed Action Memorandum for the Decommissioning of Building 123*, May.

RMRS 1997b, *RMRS Quality Assurance Program Description, RMRS-QAPD-001, Rev. 1*, January.

RMRS 1997c, *Final Sampling and Analysis Plan for the Pre-Remedial Investigation of the Mound Site Plume*, February.

Attachment 12

Documentation of Completion of Additional Conditions of the PAM

This attachment includes the following:

1. Letter from CDPHE approving the PAM and listing other commitments as a condition of the approval, dated August 25, 1998.

2. Letter from CDPHE approving the SAP dated April 10, 1998.

3. Letter from CDPHE approving the RCRA Closure Plan dated January 8, 1998.

4. Letter from CDPHE approving the Demolition Plan dated April 22, 1998.

Attachment 12
RF/RMRS-98-253.UN

STATE OF COLORADO

Roy Romer, Governor
Patti Shwaydor, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
http://www.cdphe.state.co.us/hm/

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (303) 248-7164
Fax (303) 248-7198

Colorado Department of Public Health and Environment

August 25, 1997

Mr. Bill Fitch
Decommissioning, Deactivation and Demolition Project Coordinator
U.S. Department of Energy
P.O. Box 928
Golden, CO 80402-0928

RE: Building 123 Proposed Action Memorandum Approval

Dear Mr. Fitch:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division) has reviewed the revised Proposed Action Memorandum (PAM) for Building 123 submitted for the Rocky Flats Environmental Technology Site (RFETS) on August 18, 1997. As identified in the PAM, several documents have yet to be developed as part of the decommissioning of Building 123. The documents to be developed include: the Project Execution Plan (PEP); the IHSS 148 Sampling and Analysis Plan (SAP); the IHSS 148 Remediation Plan; the RCRA Closure Plan for Unit 40; the asbestos abatement plan; and the demolition plan for Building 123. As stated in the PAM, the SAP, the remediation plan and the Unit 40 Closure Plan will be submitted to the Division for review and approval prior to initiating work governed by those documents.

The Division hereby conditionally approves the Building 123 PAM (Attachment 1). As a condition of our approval, however, RFETS shall submit the asbestos abatement plan to the Division for review at least one week prior to implementation. In addition, RFETS shall submit the demolition plan to the Division for review and approval at least two weeks prior to implementation. In the event the Division determines either of these plans are inadequate or are not fully protective of human health and the environment, the Division may issue a "stop-work" for any and all activities related to the plans.

If you have any questions regarding this matter, please contact Chris Gilbreath at (303) 692-3371.

Sincerely,

Joe Schieffelin for
Steve Tarlton
Rocky Flats Cleanup Agreement Project Coordinator

cc w/ Attachment 1:
T. Rehder, EPA
D. Steffen, RMRS, T-130F

cc w/out Attachment 1:
J. Schieffelin, CDPHE-HMWMD
D. Miller, AGO
K. Dorr, Kaiser-Hill, T-130F

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

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Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198

Colorado Department of Public Health and Environment

April 10, 1998

Mr. Bill Fitch
Building 123 Project Manager
U.S. Department of Energy
P.O. Box 928
Golden, CO 80402-0928

RE: **IHSS 121 and 148 Sampling and Analysis Plan Approval**

Dear Mr. Fitch:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division), has reviewed the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSSs) 121 and 148 at Building 123* submitted for the Rocky Flats Environmental Technology Site dated February 26, 1998. Comments from the Division have been satisfactorily resolved through written comments and meetings. The Division, as lead regulatory agency, hereby approves the attached Sampling and Analysis Plan.

If you have any questions regarding this matter, please contact Chris Gilbreath at (303) 692-3371 or Carl Sprong at (303) 692-3358.

Sincerely,

Steve Tarlton
Steve Tarlton
D&D Project Coordinator

cc w/attachment:
T. Rehder, EPA
K. Dorr, Kaiser-Hill, T-130F

cc w/out attachment:
S. Gunderson, CDPHE
D. Miller, AGO

To
Kent Dorr

From
Bill Fitch

V.G

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

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Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (303) 248-7164
Fax (303) 248-7198

Colorado Department of Public Health and Environment

January 8, 1998

Mr. Bob April
Environmental Liaison Group
U.S. Department of Energy
Rocky Flats Office
P.O. Box 928
Golden, CO 80402-0928

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To Kent Dorr	From Bill Fitch
Co.	Co.
Dept.	Phone # Did not
Fax # 5215	Fax # receive attachment

RE: Approval of RCRA Closure Plan for Components of Unit 40 located in Building 123

Dear Mr. April:

The Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment (the Division), has reviewed the Closure Plan (hereafter called the Plan) for components of Unit 40 located within the area of Building 123 submitted by the United States Department of Energy for the Rocky Flats Environmental Technology Site. The Division received one written comment on the Plan during the public comment period. The comment, however, did not alter the content of the Plan. A response to the comment has been included (Attachment 1).

The approved Plan (Attachment 2) is being issued by the Division in accordance with its authority under the Colorado Hazardous Waste Act, Sections 25-15-301 through 316, C.R.S. and the regulations thereunder. In accordance with 6 CCR 1007-3, Section 265.113(b), DOE and its integrating management contractors must complete the required closure activities identified in the enclosed Plan within 180 days after receipt of this approval.

If you have any questions regarding this matter, please contact Chris Gilbreath at (303) 692-3371.

Sincerely,

Joe Schieffelin
Permitting and Compliance Unit Leader
Federal Facilities Program

cc w/Attachment 1&2:
T. Rehder, EPA
R. Leitner, Kaiser-Hill, T-130C
Jefferson County Health Department

cc w/out Attachment 2:
L. Perrault, AGO
S. Tarlton, CDPHE

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

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Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198

Colorado Department
of Public Health
and Environment

April 22, 1998

Mr. Bill Fitch
Building 123 Project Manager
U.S. Department of Energy
P.O. Box 928
Golden, CO 80402-0928

RE: Building 123 Demolition Plan Approval

Dear Mr. Fitch:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division), has reviewed the *Demolition Plan for Building 123 Demolition Project* (hereafter called the Plan) submitted for the Rocky Flats Environmental Technology Site (RFETS) on February 17, 1998. The Close-Out Radiological Survey Plan for the 123 Cluster has been provided to the Division. Currently, final surveys have been completed for the east-wing of Building 123 and Buildings 114 and 123S. Based on our review of the information provided, all remaining materials and structures within these buildings have met the unrestricted release standards, with the exception of the concrete slab. Contaminated areas within the slab have been sealed with a weather proof epoxy coating and covered with a steel plate. Final surveys for Building 113 and the west-north wing of Building 123 have not been completed. As a result, the Site is not presently able to demonstrate that those remaining structures have met the unrestricted release standards.

Although the sequence of areas to be demolished may have changed, based on our conversations with the Site, the remaining information in the Plan is accurate. The Division hereby approves the Demolition Plan for Building 123 Demolition Project. Although ultimate disposition of the slab is pending, demolition of the surrounding walls and roof can proceed. This approval, however, does not include Building 113 and the west-north wing of Building 123. Once the final radiological survey results have been provided to the Division for review, the Division will make a determination on the information. Once we have completed our review, we will issue our decision as to whether or not the Site can proceed with the demolition of these buildings.

If you have any questions regarding this matter, please contact Chris Gilbreath at (303) 692-3371.

Sincerely,

Steve Tarlton

Steve Tarlton
D&D Project Coordinator

cc: T. Rehder, EPA
S. Gunderson, CDPHE
D. Miller, AGO
K. Dorr, Kaiser-Hill, T-130F

Attachment 13

Building 123 Administrative Record Document Summary

BUILDING 123 DOCUMENT SUMMARY

All Administrative Records associated with Building 123 should (upon completion) be submitted to Ted Hopkins (X7652) T130 F. Mr. Hopkins will update this summary and submit the AR document to Document Control. Authors of AR are responsible for submitting all documents in a timely manner. If you have authored documents that are not on this list or are aware of documents that will be developed but are not on this list, please notify Mr. Hopkins so that these documents can be added to and tracked on this summary. If you have any questions as to whether a document is subject to the AR requirements, contact Ted Hopkins at 7652 or Janet Robbins (Document Control) at 2679 for guidance.

B123 PROJECT DOCUMENTS	RESPONSIBLE PARTY	"AR" DOCUMENT	DATE RECEIVED BY "AR"	COMPLETION DATE	DATE SUBMITTED TO DOE AND THE STATE	COMMENTS
Approval to resume rad operations… Project File 000067288	Trice K RMRS	NO	9/11/97 PF	9/11/97	NA	Approval to resume radiological operations support in B123. DOC #: KDT-101-97
Asbestos Abatement Plan	Dorthea Hoyt	NO	NA	12/1/97	Unknown	Non-AR document due to Appendix 4, Exclusion "actual work of remediation as opposed to the process leading up to the decision on how to remediate a site." Plan must be submitted to the State at least one week prior to implementation.
Asbestos Abatement Plan Pre-assessment review AR# 00008	Jack Zimmer	Yes	8/7/97	7/23/97	Unknown	
Asbestos Abatement Plan: Letter of submittal to State and Plan AR# 00034	DOE	YES	12/9/97	12/9/97	12/9/97	97-DOE-05457 01854-RF-97
Asbestos Abatement: DOE approval to start Phase 2 AR# 00042	DOE	YES	12/16/97	12/16/97	NA	DOE approves K_H request for approval to proceed with Phase 2, Asbestos abatement

B123 PROJECT DOCUMENTS	RESPONSIBLE PARTY	"AR" DOCUMENT	DATE RECEIVED BY "AR"	COMPLETION DATE	DATE SUBMITTED TO DOE AND THE STATE	COMMENTS
Asbestos Characterization Report Revision 1 AR# 00024	Ted Hopkins Mary Aycock, SEG	YES	YES 11/19/97	6/6/97	Unknown	This document was submitted to AR on 11/17/97.
Auditable Safety Analysis DRS-077-97 AR# 00004	Vern Guthrie	YES	11/7/97	11/7/97	Unknown	
Chemical Inventory Report	Ernie Benson	YES	YES 11/19/97	10/27/97	Not applicable	Submitted to AR 11/17/97 as part of submittal package.
Chemical Management Short Chemical Report FINAL REPORT AR# 00037	Unknown	YES	5/1/97	4/20/97	Unknown	Included in AR#00037 by Record's Management Report dated April 20, 1997 Area Classification, Final Surveys Building 123
Davis Bacon Evaluation	Ron Heitland or Kent Dorr	NO per J.Robbins	Yes 11/24	12/10/96	Not applicable	Copy requested from Brenda Crawford X5807 on 11/17/97, received 11/19/97 Response received from AR states that this document is not part of the AR for Building 123.
Decommissioning Project Close-out Plan	Vern Guthrie	YES	NO	To be completed after final demolition.	Not applicable	AKA a Closure Report
Demolition and Decommissioning Current Activities List	Ron Heitland	NO	YES 11/19/97	3/24/97	Not applicable	Submitted AR on 11/17/97
Demolition Plan for B123	Dorthea Hoyt/ DWRC	NO	NA	12/04/97	1/7/98	Document needs to be submitted to the State at least two weeks prior to implementation.
DOE Notification prior to Demolition	Kent Dorr	NO	NA			Non-AR document due to Appendix 4, Exclusion. 10/15/97 Letter from State of Colorado requires notification. This document should be tracked to ensure compliance with this requirement.

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
Duct work washdown dismantlement guidelines perchloric acid hoods AR # 00020	DWRC	NO	8/7/97	Unknown	Unknown	Included as part of submittal for AR #00020 which included 123 PAM comments; Environmental Checklist and Duct work washown dismantlement guidelines.
ECR Building 123 Stripout	Dorthea Hoyt	NO	NA	2/24/98	NA	
Engineering Change Request (ECR) Evaluation	Dorthea Hoyt	NO	NA	2/24/98	NA	
Engineering Package for Asbestos Abatement	Dorthea Hoyt	NO	NA	4/29/97	Not applicable	Non-AR document due to Appendix 4, Exclusion "actual work of remediation as opposed to the process leading up to the decision on how to remediate a site."
Engineering Package for Demolition	Dorthea Hoyt	NO	NA	9/02/97	Not applicable	Non-AR document due to Appendix 4, Exclusion "actual work of remediation as opposed to the process leading up to the decision on how to remediate a site."
Engineering Package for Strip-out	Dorthea Hoyt	NO	NA	7/23/97	Not applicable	Non-AR document due to Appendix 4, Exclusion "actual work of remediation as opposed to the process leading up to the decision on how to remediate a site."
Environmental Readiness Evaluation (ERE)	Jill Bruse and DOE	NO	NA	11/18/97 K-H 11/28/97 DOE		Pre-construction
ERE Phase I Approval from DOE	Keith Klein	NO	1/30/98	12/3/97	Not applicable	Phase I ERE Approval
ERE Phase II Approval from DOE	Keith Klein	NO	1/30/98	12/116/97	Not Applicable	Phase II ERE Approval

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
Facility Safety Analysis or Auditable Safety Analysis. Three revisions have been completed.	D.R. Swanson AR 00007	YES	YES 11/19/97	April 1, 1997 08/19/97 11/7/97	Not applicable	The Auditable Safety Analysis and the Facility Safety Analysis are the same document. The two revisions of this document was submitted to AR on 11/1/7/97. Volume II title Facility Safety Analysis for B123 Radiological Health/Analytical Laboratories; Sitewide SAR, Volume II, Revision 0
HASP (Health and Safety Plan) Revision 0 AR# 00022	Ted Hopkins (Kirk Hilbelink)	YES	YES	6/1/97	Not applicable	Received by AR 6/1/97 RF/RMRS-97-022 #48
HASP (Health and Safety Plan) Revision 1 AR# 00046	Vern Guthrie Paul Valentenelli	YES	6/1/97	February 1998	Unknown	RF/RMRS-97-022 Revision 1 February 1998, CLG-010-98
Hazard Baseline Document Review Project File 000067154	Swanson D. RMRS	NO	8/1/97 PF	8/1/97		Hazard Baseline document review for the B123 D&D Project DOC #: DRS-058-97
Health and Safety Plan Subcontractor	Dorthea Hoyt DWRC	NO	NA		Not applicable	
IHSS 148 and 121 Remediation Plan/ Characterization Report	Ted Hopkins (Kirk Hilbelink)	YES	NO	TBD		This report will be completed after the initial sampling/characterization of the soils. NOTE: A proposed 123 PAM modification was developed that eliminated soil remediation. This document would require only characterization of the IHSS and this data would be submitted to ER for evaluation and ranking of the site.
Integrated Work Control Plan) (IWCP)	Ted Johnson	NO	NA		Not applicable	Non "AR" document due to Appendix 4, Exclusions.
Lead Characterization Report SEG AR# 00037	Ted Hopkins (Mary Aycock, SEG)	YES	YES 11/19/97	5/1/97		This document was submitted to AR on 11/17/97.

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
Lead Paint Characterization Letter requesting SEG characterize painted surfaces AR# 00032	Ted Hopkins	YES	11/20/97	11/20/97	NA	Letter requesting SEG characterize painted surfaces in buildings in accordance with 40 CFR 262.11. Ted Hopkins to Mary Aycokc
Migratory Bird Clearance AR#	Marcia Murdock	YES	3/31/98	2/12/98	Not applicable	
Milestones for B123 Clarification	Alan Parker	NO	NA	4/2/98	4/2/98 DOE	Letter 98-RF-01467 A. Parker to J. Legare RFFO Sent to Correspondence Control by K-H 4/2/98
NEPA Environmental Checklist AR#00020	DWRC?	YES	8/7/97	Unknown	Unknown	Included as part of submittal for AR #00020 which included 123 PAM comments, Environmental Checklist and Duct work washown dismantlement guidelines. Te
NEPA Checklist AR# 00003	Steve Nestea /Gary Guinn	YES	YES 11/17/97	YES 4/8/97	Not applicable	This document was submitted to AR on 11/17/97. CLG-075-97
Notification to State prior to Demolition	DWRC	YES	NO	TBD		Demolition letter must be received from the State prior to commencing work. This letter will go to DWRC.
OU13 final technical memorandum; transmittal letter AR# 000259	DOE	YES ?	11/17/94	11/17/94	Unknown	Addendum to field sampling plan and copy of the DOE response to CDPHE comments 94-DOE-11611, 04289-Rf-94. This document should be part of the IHSS AR not the 123 PAM AR. It is included in the summary to close the gap between the AR and this document.
PAM Letter Project File 000067287	S.W.Slaten DOE	NO	8/18/97 PF	8/19/97		Letter regarding PAM 123 DOC # 97-DOE-05287
PAM 123 REVISION 0 5/22/97 AR# 00029	Ted Hopkins (Kirk Hilbelink) Project File 000067594	YES	YES 11/19/97	5/22/97 AR # 00029	7/1/97	Approved by State on 8/25/97 with stipulations requiring submittal of various documents. DOC #: RF/RMRS-97-0 Revision 1 RF/RNRS-97-012 including CDPHE/DOE comment incorporation AR# 00029

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
PAM 123 Minor Modifications AR# 00040	Kent Dorr to Tim Hedhal	YES	YES,	11/17/97	11/17/97	
PAM 123 response to DOE/CDPHE Comments AR# 00002	Ted Hopkins	YES	7/18/97	7/18/97	7/18/97	
PAM 123 response to DOE/CDPHE Comments AR# 00020	Ted Hopkins	YES	8/7/97	8/7/97	8/7/97	Submittal included Environmental Checklist CLG-075-97 and Ductwork washdown dismantlement guidelines.
PAM 123 REVISION 0 Dated 8/21/97?? AR # 00028	Ted Hopkins	YES	8/25/97	8/25/97	Unknown	RF/RMRS-97-012
PAM 123 Revision 4 AR# 00017 AR# 00027 RF/RMRS-97-012	Ted Hopkins	YES	8/21/97	8/21/97	8/21/97	Previously included in above row. Broken out for clarity. AR# 00027 is the exact document as this document. Double entry into AR system. AR#00028 appears to be another identical entry except for the Revision # and the date August 25, 1997.
PAM 123 Submittal Letter AR# 00021	Vern Guthrie	YES	6/2/97	5/21/97	Unknown	RF/RMRS-97-012; 97-DOE-05064
PAM 123 Submittal Letter for Revision 3 to CDPHE AR# 00035	DOE	YES	8/19/97	8/19/97	Unknown	97-DOE-05287; 01248-RF-97
PAM 123 Submittal Letter for Revision 3 to DOE AR# 00019	K-H	YES	8/19/97	8/19/97	Unknown	97-DOE-05287
PAM Modification #3 and Cover Letter 98-RF-01889	Kent Dorr K-H to Bill Fitch DOE	YES	4/9/98	3/26/98 for PAM 4/7/98 for cover letter	4/9/98	Package included Cover Letter to Bill Fitch (DOE) for, Redline/strikeout copy of PAM, and Final 123 PAM.

B123 PROJECT DOCUMENTS	RESPONSIBLE PARTY	"AR" DOCUMENT	DATE RECEIVED BY "AR"	COMPLETION DATE	DATE SUBMITTED TO DOE AND THE STATE	COMMENTS
PAM, Minor Modification #2 PAM Revision 5 AR# 00045	T. Hedahl	YES	3/31/98	2/10/98	2/10/98	Letter from Tim Hedahl to Bill Fitch requesting DOE to submit proposed changes to PAM 97-RF-06125 RF/RMRS-97-012 KAD-109-97
Partial Closure Plan Transmittal Letter AR# 00030	DOE	YES	10/21/97	10/21/97	10/21/97	RF/RMRS-97-052, 97-RF-05672 All comments received from CDPHE and DEPA have been incorporated into the document
Partial RCRA Closure Notification 45 day	Konwinski RMRS	NO	NA	10/16/97	10/16/97?	Notification to being closure of B123 components of RCRA Unit 40 under applicable closure plan. Letters to DOE and CDPHE DOC #: GRK-288-97
Partial RCRA Closure Response to comments AR# 00015	Ted Hopkins	YES	11/4/97	11/4/97	11/4/97	RF/RMRS-97-052
Partial RCRA Closure Go ahead letter AR# 00031	Ted Hopkins	YES	11/5/97	11/5/97	11/5/97	RMRS letter provides description of proposed actions for closure prior to receipt of an approved closure plan from the State.
Partial RCRA Closure 45 Day Notice AR# 00010	K-H	YES	10/21/97	12/8/97	12/8/97	RF/RMRS-97-052; RML-030-97
Partial RCRA Closure Plan Cover Letter forwarded to CDPHE from DOE AR# 00018	DOE	YES	9/11/97	9/11/97	9/11/97	DOE Letter 97-DOE-0532
Partial RCRA Closure Plan for RCRA Unit 40 State Approval of Plan AR# 00039	Bill Fitch DOE	YES	No. See comment section.	1/8/98	11/26/98	A final approved copy of the closure plan needs to be submitted to AR. Bill Fitch should receive the Plan from the State.

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
Partial RCRA Closure Plan Modification 98-RF-01888 AR#	Kent Dorr to Bill Fitch DOE	YES	4/9/98	4/7/98	4/9/98 to Bill Fitch DOE	Package consists of Cover Letter, Redline/strikeout copy of Closure Plan and Final RCRA Closure Plan. These documents were sent to Bill Fitch DOE RFFO on 4/9/98.
Partial RCRA Closure Plan Revision 0 AR#00011	Ted Hopkins	YES	11/12/97	11/12/97	11/12/97	RF/RMRS-97-052 Public Notice period ended 12/29/97
Partial RCRA Closure Plan: State Cover Letter Approval	Joe Schieffelin	YES	1/8/98	1/8/98	NA	Approval letter originally attached to FINAL Approved Closure Plan was sent to Bob April DOE. A copy of that plan has not been received by AR.
Partial RCRA Closure State public comment notice AR# 00033	CDPHE	YES	11/26/97	11/26/97	NA	State notice of public hearing.
PCBs, Memo regarding PCBs evaluation AR# 00037 DHL-057-97	SEG?	YES	5/1/97	10/23/97	Unknown	Included in AR#00037 by Record's Management. Transformer evaluation for PCBs conducted by Paul Hepner
Preliminary Hazards Analysis (PHA)	Dorthea Hoyt AFIC/DWRC	NO	NA	Completed	Not applicable	Copy with IWCP for each project phase.
Project Completion Report	Vern Guthrie	YES	NO	One month after B123 Demolition	Not applicable	To be completed by Budget Office
Project Execution Plan (PEP) Revision 4 AR# 00006	Vern Guthrie	YES	9/11/97	9/4/97	Revision 4 was never transmitted to the State per K. Dorr	RF/RMRS-97-082

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
Project Execution Plan (PEP) Revision 3	Vern Guthrie	YES	YES 11/19/97	8/20/97	8/21/97	Submitted to AR 11/17/97.
r Quality Program Subcontractor	Dorthea Hoyt Jack Massie	NO	NA		Not applicable	
Rad Survey Closeout radiological survey plan Revision 1 Jan 1998 Revision 1 AR# 00041	John Miller	YES	1/8/98	1/2/98	Unknown	Close out radiological survey plan for the 123 Cluster B123 CRSP RF/RMRS-97-110 Second listing, same as AR#0038
Rad Survey: FINAL Report before Demolition Jan 1998 Revision 1 AR# 00038	John Miller	YES	1/8/98	1/2/98	Unknown	Close out radiological survey plan for the 123 Cluster B123 CRSP RF/RMRS-97-110 Same listing as AR#00041 above.
Radiological Area Classification: Final Surveys Building 123 Cluster AR#	John Miller	YES	YES 11/19/97	11/16/97	Not applicable	Submitted to AR 11/17/97 as part of submittal package.
RCRA Closure Plan, Partial Closure RCRA Unit 40, State approval Cover Letter AR#	State to Bill Fitch DOE	YES	Sent 1/13/98	1/8/98	NA, State approval letter	One public comment was received and incorporated into the final Closure Plan. A copy of the Final RCRA Closure Plan was not received with the FAXed cover letter from Bill Fitch.
RLCP DRAFT (See AR B123-A-00025) AR# 00043	Ted Hopkins	YES	7/1/97	7/1/97	Unknown	See AR B123-A-00025 for RLCP RF/RMRS-97-045 Revision 0 Document Reconnaissance Level Characterization Plan
RLCP Revision 0 RF/RMRS-97-045 AR# 00044	Ted Hopkins	YES	9/4/97	9/1/97	Unknown	Reconnaissance Level Characterization Plan Revision 0

B123 PROJECT DOCUMENTS	RESPONSIBLE PARTY	"AR" DOCUMENT	DATE RECEIVED BY "AR"	COMPLETION DATE	DATE SUBMITTED TO DOE AND THE STATE	COMMENTS
RLCP DRAFT Revision 0 AR# 00025	Ted Hopkins	YES	7/29/97	7/29/97	Unknown	See AR B123-A-00043 for Pages 7, 8, and 9.
RLCR (Reconnaissance-Level Characterization Report) AR# 00026	Ted Hopkins (Mary Aycock)	YES	YES 8/13/97	8/13/97	Unknown	Received by AR RF/RMRS-97-021
Safety: Auditable Analysis Review AR# 00005 Project File # 000067290	Swanson D RMRS	YES	NO sent PF 8/19/97	8/19/97	NA	Auditable Safety Analysis Review for B123 D&D Project. DOC #: DRS-058A-97
Sample Results Rinsate from perchloric acid wash	Ted Hopkins Paul Valentenelli	YES	NO	1/6/97		Preliminary results that will require modification to comply with RCRA Closure Plan. Sample results will be submitted to AR when final results are received.
Sample Results: RCRA Closure Plan AR#	Ted Hopkins	YES	3/31/98	3/10/98	3/26/98 CDPHE	Sample analysis for: Sump 125, Sump 156, Sump 157, Sump 158, PVC Pipe, Steel Pipe, underground piping and water baseline.
SAP for IHSS 148 & 121 Final Report AR#	Ted Hopkins Paul Valentinelle	YES	2/18/98	2/17/98	2/17/98 DOE	Additional clarification requested by Bill Fitch. Response to these comments was made by Paul Valentinelle. All concerns were addressed.
SAP, Comments by CDPHE AR#	Chris Gilbreath	YES	3/31/98	March 98	NA	Comments incorporated into new/revised SAP.
SAP, Response to comments from CDPHE AR#	P. Valentinelli	YES	3/31/98	3/19/98	3/19/98	
SAP: Concrete Slab B123 AR# 00036	Ted Hopkins Paul Valentenelli	YES	12/17/97	12/17/97	12/17/97	SAP to characterize the B123 slab. FR/RMRS-97-110, Revision 1

B123 PROJECT DOCUMENTS	RESPONS-IBLE PARTY	"AR" DOC-UMENT	DATE RECEIV-ED BY "AR"	COM-PLETION DATE	DATE SUB-MITTED TO DOE AND THE STATE	COMMENTS
SAP: Letter from DOE forwarding SAP to CDPHE AR# 00018	DOE	YES	10/2/97	10/2/97	10/2/97?	97-DOE-0532 Combination submittal includes Closure Plan and SAP in the same AR# 00018.
SAP: Sampling Analysis Plan for IHSS 148 & 121 Revision 4 AR# 00001 RF/RMRS-97-023	Ted Hopkins Paul Valentinelli	YES	YES 11/19/97	11/17/97	A draft copy was sent to the State on 11/18/97.	Approval of State is required before any work is initiated. Final approval is pending QA approval and will then require a resubmittal to the State. A draft SAP was sent to AR 11/17/97.
SAP: Soil sampling and analysis plan AR# 00016	Ted Hopkins Kirk Hilbelink	YES	8/1/97	7/23/97	Unknown	RF/RMRS-97-023
SAP: Submittal letter DOE to CDPHE Revision 0 AR# 00047	DOE	YES	3/4/98	2/19/98	3/4/98	
SAP: IHSS 121 and 148 SAP. Revision 0, FINAL AR# 00049	Ted Hopkins Paul Valentenelli	YES	2/23/98	2/23/98	2/23/98	
SAP: Soil Sampling and Analysis Plan to Characterize IHSS 121 and 148 at B123 and Cover Letter to DOE AR#00045	Tim Hedhal to Bill Fitch DOE 98-RF-01888	YES	4/9/98 by K-H	2/17/98	4/9/98 to DOE	Plan and cover letter submitted to Bill Fitch DOE. Copy to Administrative Records. TGH-005-98 98-RF-00381 Submittal included 123 PAM Minor Modification which has the same AR# 00045.
SITE--WIDE DOCUMENT RMRS H&S Program RF/RMRS-96-0065	Ken Jenkins	YES	NO		Not applicable	Document Control was requested to send a copy to Administrative Records on 11/17/97. A copy may be available from Tonya Sangeline or Ken Jenkins.

Attachment 14

Waste Management Plan for Building 123

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-029

INFORMATION ONLY

WASTE MANAGEMENT PLAN FOR BUILDING 123

REVISION 1

March 1998

WASTE MANAGEMENT PLAN
FOR
BUILDING 123

REVISION 1

MARCH 1998

This Waste Management Plan has been reviewed and approved by:

Martin Wheeler, Vice President Waste Management	3/23/98 Date
Vern Guthrie, Project Manager	3/9/98 Date
Gary Konwinski, Environmental Manager	3/12/98 Date
Ken Lenarcic, Traffic Management	3/25/98 Date
Mark Brooks, Environmental Safety Health &Quality	3-17-98 Date

This Waste Management Plan was prepared by:

Dorthea Hoyt, Project Engineer, RMRS	3/9/98 Date

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS iii

1.0 INTRODUCTION 1

1.1 PURPOSE 1

1.2 SCOPE 1

2.0 RESPONSIBILITIES/POINTS OF CONTACT 2

2.1 PROJECT MANAGER 2

2.2 WASTE MANAGEMENT - ENVIRONMENTAL COORDINATOR (EC) 3

2.3 WASTE MANAGEMENT - LIAISON 3

2.4 WASTE OPERATIONS SUPPORT 3

2.4.1 Solid Waste Operations 3
2.4.2 Waste Disposal Projects 4
2.4.3 Waste Certification Oversight 4

2.5 TRAFFIC MANAGER 4

2.6 RADIOLOGICAL ENGINEER 4

2.7 CHARACTERIZATION SPECIALIST 4

3.0 WASTE GENERATION 5

3.1 BUILDING STRIP-OUT 5

3.2 ASBESTOS ABATEMENT 6

3.3 DEMOLITION 6

3.4 REMEDIATION OF IHSS 7

4.0 WASTE TYPES 7

4.1 LOW-LEVEL (LL) WASTE 7

4.2 HAZARDOUS WASTE/MIXED WASTE 7

4.3 INDUSTRIAL WASTE 8

4.4 TOXIC SUBSTANCE CONTROL ACT (TSCA) WASTE 8

4.5 ASBESTOS WASTE 8

4.6 PROPERTY UTILIZATION AND DISPOSAL (PU&D) MATERIALS 9
5.0 WASTE CERTIFICATION 13
6.0 WASTE PACKAGING 13
7.0 ONSITE STORAGE, TRANSPORTATION, AND FINAL DISPOSITION 14
8.0 WASTE MINIMIZATION 14
9.0 COMPLETION REPORT 14
10.0 REFERENCES 14

TABLES

4-6 Summary of Waste Management Plan 10

ACRONYMS

ACM	Asbestos-containing material
CA	Contaminated Area
CDPH&E	Colorado Department of Public Health and the Environment
D&D	Decontamination and Demolition
DCI	DynCorp, Inc.
DOE	U. S. Department of Energy
DOT	Department of Transportation
EPA	U.S. Department of Environmental Protection Agency
ER	Environmental Restoration
ft^3	cubic foot
IDC	Item Description Code
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
LLW	Low-Level Waste
LL/LLM	Low-Level/Low-Level Mixed
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Agency
PCB	Polychlorinated biphenyl
PU&D	Property Utilization and Disposal
RBA	Radiological Buffer Area
RCT	Radiation Control Technician
RFETS	Rocky Flats Environmental Technology Site
RMRS	Rocky Mountain Remediation Services, L.L.C.
TSCA	Toxic Substance Control Act
WAC	Waste Acceptance Criteria
WFC	Waste Form Code
WMP	Waste Management Plan
WSRIC	Waste Stream Residue Identification and Characterization
yd^3	cubic yard

WASTE MANAGEMENT PLAN FOR BUILDING 123

1.0 INTRODUCTION

Decontamination, dismantlement, and demolition of Rocky Flats Environmental Technology Site (RFETS) facilities generate a variety of solid and liquid wastes. The waste may be designated as radioactive, mixed, hazardous, non-hazardous or asbestos waste and must be managed in accordance with State and Federal regulations.

Building 123 was one of the first 10 buildings constructed at Rocky Flats. The building provided an analytical laboratory, dosimetry and instrument calibration facility since its construction in 1953. B123 also provided office space for radiation health specialists; storage for all radiological health records; a laboratory for calibration and repair of criticality alarms and other repair/calibration shops. B123 once housed medical research until such operations were relocated to Building 122.

1.1 PURPOSE

The purpose of this document is to describe the waste management program that addresses waste management requirements for the decontamination and decommissioning of Building 123.

The technical basis for development of the Waste Management Plan (WMP) is outlined in the U.S. Department of Energy, *Office of Environmental Management Decommissioning Resource Manual*, dated August 1995, and the Draft *Decommissioning Program Plan*.

1.2 SCOPE

The scope of this project includes the complete removal of all internal process waste piping, process hoods and ductwork, laboratory cabinets, radiologically contaminated materials, polychlorinated biphenyl (PCBs), and all asbestos containing materials from Buildings 123. Buildings 113, 114, 123 and 123S will be demolished and materials removed down to the base slab. If sampling underneath the slab finds contamination present, the building slab and foundation will be removed as required to remediate the contamination. Remediation of the soil around Building 123, and possible underground contamination will be done according to RMRS Environmental Restoration (ER) procedures. These remediation activities will also generate low-level radioactive waste (LLW) in the form of soil, piping, and debris. Some hazardous or mixed waste may also be present. During building demolition this project will generate asbestos and low-level waste. Hazardous and mixed waste will also be generated. Hazardous chemicals and laboratory equipment will be removed during the building deactivation phase. Process waste lines may have low levels of internal contamination caused by processing bioassay and environmental samples. Localized areas of contamination within the building may be isolated and decontaminated, to limit the amount of low-level and hazardous waste that is generated. Projected volumes and types of waste to be generated are discussed below. They are based upon preliminary planning, reconnaissance characterization activities, and actual waste generated during the decommissioning of Building 123 at the time this document was revised.

There will also be a large quantity of asbestos contaminated waste. Asbestos removal will be subcontracted to a commercial vendor who is licensed to remove and handle this type of waste. Transportation and disposal of non-contaminated asbestos waste will be handled by the subcontractor, working with the Rocky Mountain Remediation Services, L.L.C. (RMRS) Waste Disposal Group and DynCorp, Inc. (DCI) Traffic Management. They will make certain that the waste goes to a site that is licensed for asbestos disposal, that is also approved to accept waste from Rocky Flats. The processing, packaging, storage, and transportation of industrial waste and the asbestos waste will be handled by subcontractors with direct oversight of Waste Operations. RMRS Waste Disposal and DCI Traffic Management personnel will also oversee these operations. Offsite transportation shall comply within Department of Transportation (DOT) regulations. Low-level (LL) radioactive waste, mixed wastes, and asbestos contaminated with low-level radioactivity will be certified the Kaiser-Hill Waste Certification group.

In the event a waste stream, not identified in this summary, is generated by this project and this waste stream has the potential of impacting human health or the environment, then RMRS or its subcontractor is required to immediately notify Kaiser-Hill's Environmental Management and Compliance Division of the existence of this waste stream. Jointly RMRS and Kaiser-Hill will determine the most appropriate management and disposal options for this waste stream.

2.0 RESPONSIBILITIES/POINTS OF CONTACT

This section of the WMP presents an overview of the project organization. These individuals are the main points of contact for various project activities. Key waste management personnel from within the project and other waste management contacts for the project, and a description of their waste management responsibilities is presented below.

2.1 PROJECT MANAGER

The Project Manager is responsible for management of the project including overall responsibility for the waste generated by the project. These responsibilities include assuring adequate and timely characterization of the waste and the projection of the quantity of waste expected. In addition, the Project Manager should ensure that required plans are in place to handle the types of waste to be generated, see that a cost estimate is made and that funds are available to dispose of the waste, and oversee and coordinate all project-specific waste management issues, including preparation of the WMP and assuring its implementation. Project personnel will also decontaminate and size reduce the waste when it is prudent do so. The Project Manager coordinates activities with the Waste Management Liaison, Project Engineer, and Demolition Manager to ensure that issues associated with waste generation are addressed, including proper characterization, packaging, meeting appropriate RMRS waste acceptance criteria, and filling out relevant paperwork, such as travelers, Waste and Environmental Management System updates, etc. It is the responsibility of the project to ensure that waste is identified, properly documented, segregated, packaged, and prepared for storage or shipment. Waste Operations then receives the waste for onsite storage, or oversees offsite shipment.

D&D project personnel assigned to the project will provide:

- Waste generation, segregation, decontamination and size reduction,
- Technical support regarding waste generation, packaging and characterization; and
- Review of Integrated Work Control Packages (IWCPs) for waste management actions.

2.2 WASTE MANAGEMENT - ENVIRONMENTAL COORDINATOR (EC)

This individual is assigned to the Decontamination & Decommissioning (D&D) Construction Management group. He assists D&D projects with all aspects of waste management. For this project, he will assume the duties of the Environmental Coordinator when building decommissioning begins. This includes coordinating with the Waste Management Liaison to handle environmental compliance and waste management issues, and interfacing with waste management personnel to schedule and complete waste management activities in a timely manner and ensure compliance with all relevant requirements.

The Waste Management Coordinator arranges for waste packages for low-level, hazardous, or mixed waste, and schedules technicians and certification personnel, as needed, to package and prepare waste for receipt by Waste Management.

2.3 WASTE MANAGEMENT - LIAISON

The Waste Management Liaison coordinates with the Project Manager and is responsible for coordination of waste management activities across organizational lines. Some of the groups that may become involved include: Radiological Engineering, the Waste Operations group for handling, storage and disposal, Traffic Management, the Waste Management Environmental Coordinator, and other groups such as Nuclear Safety which may assist with waste management activities. This individual will assist the Waste Management Coordinator as needed, providing access to waste management personnel across organizational lines. This individual is the contact point for all waste management activities. He coordinates onsite transfers, and oversees subcontractor operations that deal with the loading of shipments for offsite disposal. He works with Traffic Management to prepare the Bills of Lading or the U.S. Department of Environmental Protection Agency (EPA) Uniform Hazardous Waste Manifests as needed, and coordinate all shipments with Traffic Management.

2.4 WASTE OPERATIONS SUPPORT

Waste Operations provides services to the RFETS, including receipt of waste and other materials from the project, disposal and recycle as available, and storage of waste. Waste Characterization will be done by personnel assigned to the project. Waste Operations will oversee the transportation of waste both onsite and offsite. Industrial waste shipments, and asbestos will be handled by subcontractors. Waste Operations will coordinate offsite shipments and ensure that the waste is sent to an approved disposal site. They will store radioactive waste, unless arrangements are made to ship the directly to a disposal site. If waste is shipped directly offsite, they will provide oversight and coordination of all shipments.

2.4.1 Solid Waste Operations

Solid Waste Operations can provide the following services and support for the project:

- Receipt of radioactive waste that complies with RMRS Waste Acceptance Criteria (WAC),
- Technical support regarding waste generation, packaging, and characterization,
- Low-Level/Low-Level Mixed (LL/LLM) guidance through established programs,
- Storage of waste; and
- Review of IWCPs for waste management actions.

2.4.2 Waste Disposal Projects

Waste Disposal Projects is responsible for:

- Offsite shipment of project wastes and materials for disposal, and recycling,
- Preparing waste for offsite shipment,
- Maintaining arrangements with offsite facilities for receipt of RFETS waste; and
- Scheduling waste disposal activities as necessary to support project requirements.

2.4.3 Waste Certification Oversight (Kaiser-Hill)

Waste Certification Oversight is responsible for:

- waste certification of radioactive waste for shipment purposes.

2.5 TRAFFIC MANAGER (DCI Traffic Management)

Waste transfer onsite and offsite will be accomplished with the assistance of a Traffic Management representative. This individual will coordinate the onsite transfer and offsite shipping of waste. Traffic Management works with the Waste Management Coordinator, Construction Superintendent, Waste Management Liaison, and the Environmental Coordinator (EC) to ensure that waste packages are transported in a timely manner to the appropriate treatment, storage, or disposal location. A large portion of the waste is expected to be shipped directly offsite for disposal. Traffic Management is responsible to see that waste packages meet the requirements of the Department of Transportation (DOT) (49 CFR) for shipping of waste offsite. This group is also prepares the Bills of Lading or EPA Uniform Hazardous Waste Manifests for the waste shipments.

2.6 RADIOLOGICAL ENGINEER

Radiological Engineering is responsible for all radiological surveys, release of equipment or materials to Property Utilization and Disposal (PU&D) or for offsite disposal, radiological health & safety, and other miscellaneous activities associated with the radiological aspects of D&D. Radiation Control Technicians (RCTs) working under the direction of Radiological Engineering will perform surveys and assay equipment and materials. No equipment or building materials, including building rubble, will be allowed to leave Building 123 without receiving proper release from this group.

2.7 CHARACTERIZATION SPECIALIST

This individual is responsible for conducting the Reconnaissance Characterization, and directs all sampling and analysis of building areas for both radiological and hazardous materials identification. She works together with Radiological Engineering to develop the survey plans. In the same way, they will work with environmental specialists to develop sampling and analysis plans for the IHSS areas, and as appropriate, sampling strategies for determining hazards within the building. (asbestos, lead, PCBs, beryllium, and other potential hazardous materials). The Characterization Specialist is responsible for generating a Reconnaissance Characterization Report, Sampling & Analysis plans, and other sampling strategies as needed, and the Final Characterization Report for the project.

3.0 WASTE GENERATION

This section of the WMP provides a detailed description of the wastes and excess materials that are expected to be generated by the Building 123 Decommissioning Project. The D&D Waste Stream Residue Identification and Characterization Book (WSRIC), process knowledge and reconnaissance characterization have been used to identify these wastes and excess materials. The D&D WSRIC can be referenced to obtain characterization information and a description of the methods for waste segregation based on Item Description Codes (IDCs) or Waste Form Codes (WFCs). This information is required to properly characterize and prepare radioactive or hazardous waste for packaging and certification. Characterization and sampling requirements are defined in the Building 123 Reconnaissance Level Characterization Report, the Characterization Plan and related IWCPs. The Building 123 WSRIC will be revised to include Process 25 information which will reference the Building 123 D&D waste generation.

Waste will be generated during each of the following phases of the project: (1) Building Strip-out, (2) Asbestos Abatement, (3) Demolition, and (4) Remediation of the Individual Hazardous Substance Sites (IHSS). All types of waste will follow a similar process flow for disposition. After waste is generated, it must be identified and classified using established methods and documentation. Whenever possible, it is segregated for reuse or recycle. The waste is then prepared for packaging. This may include size reduction, consolidation, and bagging. Project personnel will accomplish these activities, and prepare the required documentation. Radioactive waste must be certified and packaged by trained personnel. It must conform with the particular RMRS waste acceptance criteria, depending on its classification. After the waste is packaged, the project delivers the waste to Waste Operations for storage or offsite disposal. Non-radioactive, non-hazardous waste may be taken directly offsite and handled by a subcontractor, however, Waste Management personnel will oversee their activities. Final documentation must be prepared before shipments leave the Building 123 area. They may include a radiological release, manifests, and Bills of Lading. Waste Management will locate the waste in a storage area and arrange for offsite shipment. The following sections describe the types of waste and how they will be handled for each phase of the project.

3.1 BUILDING STRIP-OUT

Activities during this phase will include the removal of any leftover equipment, radiological contamination (including floor tile and interior walls), and strip-out of recyclable materials. Process waste lines, hoods and ducting, scrubber systems, and similar types of support systems will be removed. Potential types of waste that will be generated during strip-out include low-level, hazardous, industrial, PCB waste, asbestos, low-level asbestos, and low-level mixed waste. Handling of each these waste streams is discussed below. Handling of asbestos and low-level asbestos waste is discussed in Section 3.2.

Low-level waste and low-level mixed waste will be handled by qualified, waste packaging technicians. The technicians will work with decontamination personnel and radiation monitors to identify and segregate the low-level waste. Drums or boxes will be provided by the Waste Disposal group. The technicians will package and label the waste, and arrange for it to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Waste Management Environmental Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

Hazardous waste will be handled in much the same manner, except it will not be necessary to certify the waste. It must be properly packaged in drums, labeled, and the required documentation generated. This will be done by the Waste Management Environmental Coordinator. The drums or boxes will then be turned over to Waste Operations for storage and disposal. Any items or debris containing hazardous material must be handled as hazardous waste.

Industrial waste will be generated from building debris and leftover materials. It will include any items or debris that will not be accepted by PU&D for recycling. PU&D will take much of the equipment, and certain metallic items such as copper wire or lead that can be recycled. Industrial waste will be sent to the USA Waste Landfill in Erie, Colorado. During this phase of the project, any waste destined for a landfill will be handled by the Waste Disposal group. Appropriate documentation will be generated by the Project Waste Coordinator and Traffic Management.

3.2 ASBESTOS ABATEMENT

Asbestos abatement will occur either concurrently or immediately following strip-out activities. During this phase of the project, asbestos containing materials will be removed from the building. Asbestos waste and low-level asbestos waste will be generated. RCTs will survey the materials before they are removed from the building. The asbestos to be removed includes floor tile and mastic, wall board, drywall mud and tape, cementitious cabinet linings, loose fill insulation in the concrete block, laboratory counter top mastic, doors, pipe insulation, and plastic and gloves used during abatement. This waste will include plastic sheeting, gloves, tyvex suits and other materials that are exposed to the asbestos during abatement. Some building rubble will also be accumulated as non-asbestos containing materials are removed to gain access to the asbestos. This rubble will be classified and handled appropriately.

The asbestos waste must be handled by qualified asbestos workers. It will be double bagged and placed in containers for shipment to an authorized landfill. The subcontractor will label the containers with asbestos warning labels and other required packaging labels. If radiation is detected, the asbestos that is contaminated will be classified as low-level asbestos waste. In addition, it was determined that asbestos containing, interior walls should be handled as low-level asbestos waste due to radiological contamination concerns and high costs for decontamination and final radiological surveys.

Project personnel will ensure that the waste is properly packaged, labeled, and that manifests and a Bill of Lading are prepared. EPA Uniform Hazardous Waste Manifests and the Bills of Lading will be prepared by Traffic Management. The Waste Disposal group and Traffic Management will coordinate shipment of the waste offsite.

When radioactive asbestos containing waste is generated and then qualified, waste packaging technicians assigned through the project will be called upon to take the waste from the subcontractor. Drums or boxes will be provided by the Waste Disposal group. The technicians will manage packaging and labeling of the waste, and arrange for it to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Project Waste Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

3.3 DEMOLITION

Waste generated during demolition will consist of all of the remains of the building including exterior and concrete walls, roof and windows. Prior to demolition and after completion of all strip-out and asbestos abatement activities, the building will undergo Final Radiological Surveys to verify all radiological contamination has been removed. All waste generated during demolition will be industrial waste. This waste will be loaded in roll-off boxes or dump trucks in preparation for offsite shipping. It must meet the criteria for shipment to an approved offsite landfill. The Waste Coordinator will ensure that the demolition subcontractor complies with all requirements for offsite shipments, and he will obtain radiological release from Radiological Engineering. The subcontractor will follow procedures as described in *Sanitary Waste Offsite Disposal*, 1-PRO-573-SWODP, 1997. The subcontractor will load and ship the waste, under the guidance of Waste Operations. Waste Operations will coordinate with Traffic Management to prepare the Bills of Lading.

Should any hazardous waste be discovered during the demolition activities, trained waste technicians from the site will be used to characterize, package, and handle this waste as detailed above.

3.4 REMEDIATION OF IHSS

Remediation of the IHSS will be performed by RMRS Environmental Remediation. At this stage of the project, the building will have been removed from its foundation, demolished, and the industrial waste shipped offsite. A sampling plan has been written to characterize the slab and waste under the slab. The results of the sampling will provide general information on the contamination in the soil. Depending upon the results of the initial sampling, more detailed characterization may be conducted and a remediation plan prepared. If underground contamination, radioactive or hazardous, is discovered, the remediation of the site will produce low-level, hazardous, or mixed wastes. Depending upon the extent of the contamination, and the options pursued, it is expected that contaminated soil and pipelines would be the major source of waste. Plastic, tools, personal protective equipment, and other materials associated with remediation would also be generated. Contaminated waste will be handled by qualified, waste packaging technicians who will work with decontamination personnel and radiation monitors to identify and segregate the hazardous or low-level waste. Results from sampling, and radiation surveys will be used to guide this work. Drums or boxes will be provided by the Waste Disposal group. The technicians will package and label the waste, and arrange for radioactive waste to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Waste Management Environmental Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

4.0 WASTE TYPES

This section provides information of the various classifications of waste and materials expected to be generated by the project. (All of the PU&D excess materials are expected to be removed from the building prior to beginning strip-out. Recyclable metals and miscellaneous items have been shipped to PU&D throughout strip-out and asbestos abatement phases.) They have been included for informational purposes only. This information is based upon the Reconnaissance Level Characterization and interviews with current and prior building occupants.

4.1 LOW-LEVEL WASTE

Low-level waste is waste that contains radioactivity and is not classified a high-level waste, transuranic waste, spent nuclear fuel, or 11e(2) byproduct material as defined by DOE Order 5820.2A, *Radioactive Waste Management*. Historical information suggests that all of the radioactive waste produced as a result of Building 123 decommissioning activities will be low-level in nature. Low-level waste will be generated and managed in compliance with the RMRS WAC and the RFETS Low-Level Waste Management Plan. LLW that results from decommissioning activities will be stored onsite or, where feasible, shipped directly to an approved offsite disposal or recycle facility.

4.2 HAZARDOUS WASTE/MIXED WASTE

A hazardous waste is defined as waste that exhibits the characteristics of corrosivity, ignitability, reactivity, or toxicity or that is listed in 6 CCR 1007-3, Section 261, Subpart D. (Hazardous waste that has been mixed with radioactive waste.) All chemicals used in the building are described in the Building 123 WSRIC book. Hazardous chemicals were disposed of in Satellite Accumulation Areas, and as a result, discovery of hazardous chemical waste is unlikely. If found, hazardous waste will be managed in compliance with the *Hazardous Waste Requirements*

Manual, *RFETS Low-Level Waste Management Plan*, and *Non-Radioactive Waste Packaging*, 1-E-88-WP-1027-NON-RAD.

Waste generated during deactivation and strip-out activities, such as equipment, chemicals, and process systems are anticipated to address the bulk of the hazardous waste residing in Building 123. All of the process waste piping (aboveground) and ancillary equipment will be handled as mixed waste. Mixed or hazardous waste that results from decommissioning activities will be stored in permitted areas onsite or, where feasible, shipped directly to an approved offsite disposal or recycle facility. All rinsate generated during RCRA closure activities will be disposed of as mixed or hazardous waste at Building 374.

4.3 INDUSTRIAL WASTE

Industrial waste is, for the purpose of this project, defined as that waste which meets industrial landfill requirements. Industrial waste is waste that is not hazardous, does not contain asbestos or PCBs, and is not radiologically contaminated. Industrial waste will not be restricted for disposal by the Land Disposal Restrictions. This waste will be managed in accordance with all applicable rules and regulations. It is anticipated that the resultant rubble will be loaded into roll-offs and shipped to an offsite landfill. The subcontractor will follow procedures as described in *Sanitary Waste Offsite Disposal*, 1-PRO-573-SWODP, 1997. These procedures will describe the methods for preparing and shipping the waste. They also include the prohibited items. It will be the responsibility of the subcontractor, with monitoring by the Waste Coordinator, to conform with this procedure. The subcontractor will also provide safe transportation of the rubble and waste to the landfill. The DCI Traffic Management will prepare the Bills of Lading for the shipments. Waste Disposal personnel will coordinate these shipments.

4.4 TOXIC SUBSTANCE CONTROL ACT (TSCA) WASTE

Non-radioactive contaminated PCB waste may be produced from the removal of light fixtures. This waste will be handled and packaged in compliance with 1-10000-EWQA, *TSCA Management Plan*. The Subcontractor will package the waste and onsite Transportation will transfer it to an RMRS storage area. The Waste Disposal group will then be responsible for coordinating offsite shipment and disposal.

4.5 ASBESTOS WASTE

Four types of asbestos containing wastes will be generated during the decommissioning of Building 123:

(1) Non-radiologically contaminated, friable Asbestos-containing material (ACM),

(2) Non-radiologically contaminated, non-friable ACM,

(3) Radiologically contaminated, friable ACM; and

(4) Radiologically contaminated, non-friable ACM.

Asbestos containing materials will be handled in accordance with the Colorado Department of Public Health and Environment (CDPH&E), Occupational Safety and Health Agency (OSHA), TSCA requirements and applicable RFETS requirements. Asbestos waste will be packaged in compliance with 1-10000-TRM-WP-2401, *Asbestos Waste Management.* RMRS Construction Management will oversee the abatement contractor activities. Radiological Engineering is expected to determine whether any of the asbestos will be disposed of as low-level waste. If so, Radiation Worker Training will be required for the asbestos workers. Packages will be provided by the site, and loading of the packages will be supervised by Waste Operations personnel. The low-level asbestos will then be turned over to RMRS Waste Disposal. The subcontractor will label packages with asbestos warning labels. The subcontractor will comply with all other packaging and shipping requirements. The offsite contractor performing the abatement work will be responsible for packaging and preparing the asbestos waste for shipment. Traffic Management will issue the Bills of Lading or EPA Uniform Hazardous Waste Manifests, and the offsite contractor will deliver the waste to an approved disposal site. The subcontractor should use the approved offsite disposal company or make certain that any disposal site that is used receives approval from the U.S. Department of Energy (DOE) and the site.

4.6 PROPERTY UTILIZATION AND DISPOSAL MATERIALS

PU&D materials, as defined in this WMP, are those materials that have historically been accepted for storage and reuse by PU&D. These materials include, but are not limited to, office equipment such as desks, chairs, tables, carts, and bookshelves, which are located in non-contaminated areas or have been located in contaminated areas but confirmed as non-contaminated through radiological survey. The estimated volume of materials designated for PU&D is 15,800 ft^3. These materials will be sent to PU&D. Table 4-6 shows the estimated generation volumes incorporated in Building 123.

Table 4-6 Summary of Waste Management

BUILDING 123 D&D PROJECT

Estimated generation volumes incorporated into Building 123's Waste Management Plan (June 1997 may differ from those volumes used in this Summary. Variations are due to completion of additional characterization and selection of waste management operations.

Waste Stream	Packaging and Onsite Storage	Final Disposition	Estimated Generated Volume
ASBESTOS NON-RAD Friable (PPE, TSI in non-RMMA rooms, wood & metal in containment, loose insulation in block walls). Non-friable (Doors, counter tops, cabinet linings).	Gray 55-gallon drums or strong tight boxes; friable 6 mm plastic double bagged; crate, roll-off; B666 or outside	Friable, Kettleman Hills through Chem Waste Contract Non-friable, U.S.A. Waste, Erie, CO.	Friable: 120 yd^3 Non-friable: 90 yd^3
ASBESTOS RAD Friable (Drywall, TSI in RMMA rooms) Non-friable (Floor tile, transite)	White 55-gallon drums or boxes; 6 mm plastic double bagged or strong tight boxes/crates; B664 or B644 Cargo Containers	Nevada Test Site (NTS)	Friable: 170 yd^3 Non-friable: 130 yd^3
PCBs NON-RAD ballasts non-leaking	Black and yellow drum with a plastic liner Building 666	Chem Waste Contract to Rollins, Inc. at Deerpark, TX.	< 1 yd^3. This sum is a total of all PCB categories. Until the ballasts are removed, it is impossible to categorize this waste stream correctly.
PCBs NON-RAD leaking ballasts and all other regulated PCBs (articles, etc.)	Black and yellow drum with plastic liner; document on traveler if TSCA regulated. Building 666	Chem Waste Contract to Rollins, Inc. at Deerpark, TX.	Totaled in PCB Non-Rad category.
PCBs RAD ballasts, non-leaking (LLW only, not TSCA regulated)	White drum with a plastic liner Building 666	Oak Ridge	Totaled in PCB Rad category.
PCBs RAD Leaking ballasts and all other rad contaminated (LLW) and TSCA regulated wastes	White drum with a plastic liner Building 666	Oak Ridge	Totaled in PCB Rad category.

Waste Stream	Packaging and Onsite Storage	Final Disposition	Estimated Generated Volume
Hazardous Waste NON-RAD fluorescent tubes, solvents, paints, lead, chemicals, metals	Black and white drum tubes crushed onsite 123S or RCRA Unit 1	Chem Waste Contract	< 1 yd^3
Hazardous waste rinsate (RAD and NON-RAD) This waste stream will be generated during RCRA closure of part of RCRA Unit 40.	Process waste system	Managed onsite in a wastewater treatment unit. (Building 374)	7,500 gallons
Mixed Wastes RAD Non-homogeneous Homogeneous	White 55-gallon drum 904A or Unit 14 or Unit 15A in Building 906	Non-homogeneous LLMW does not have a designated disposal site at this time. Homogeneous Oak Ridge LLM and LL solvents Envirocare, UT	Homogeneous: 9 yd^3 Non-homogeneous: <1yd^3
Low-Level Waste plaster, wall materials, windows, panels, cement, etc.	White drum or white boxes 1/2 of full size wooden crates complying with Work Order 1100 or Work Order 4034. B664 Cargo Containers or B440 Cargo Containers	Nevada Test Site	375 yd^3
Sanitary or Industrial Waste NON-RAD	Roll-offs either 20 or 30 yard roll-offs	U.S.A. Waste Erie, CO	3500 yd^3
PU&D materials and processed RCRA Scrap Metal destined for reclamation. NON-RAD	Not regulated under RCRA (file systems, cabinets, shelves, desks, fumes hoods, muffler furnaces, lab benches, etc). Lead acid batteries, lead counter weights.	PU&D Recycle: Gahagen Metal & Iron Denver, CO Lead: Gopher Resources Egan, MN	500 yd^3

Waste Stream	Packaging and Onsite Storage	Final Disposition	Estimated Generated Volume
Process RCRA Scrap Metal destined for reclamation. RAD	White box and/or container	No contract yet in place. Options include SEG and MSC. No shipments will be made until a contract is in place with a K-H approved vendor.	< 1 yd^3

5.0 WASTE CERTIFICATION

Waste Certification activities will be conducted by trained personnel assigned to the project. Waste Characterization data and packaging requirements for low-level wastes will meet the requirements of the Nevada Test Site's Waste Acceptance Criteria (NTSWAC, RO 9/96). Procedures and policies for managing low-level wastes are outlined in the RFETS Low-Level Waste Management Plan. (44-RWP/EWQA-0014, Rev. 1, 1996) All radioactive waste must be certified prior to transfer to Waste Operations.

Release of non-hazardous material, debris, and equipment from a site contaminated with hazardous materials is accomplished by demonstrating that the materials or wastes do not exhibit any of the characteristics of hazardous waste as identified in Subpart C of 6 CCR 1007-3 SS261 or from Subpart D. Process knowledge and operating history related to the facilities can also be used to segregate hazardous contaminant areas from unaffected areas.

Building 123 WSRIC books was used as a part of the certification process. The Building 123 WSRIC book describes each waste stream resulting from processes that were performed in the building. Processes are described, chemicals used in the process are identified, and resulting wastes IDCs or WFCs are characterized in the Building 123 WSRIC book. This book provides guidance for characterizing and disposing of waste during the deactivation phase of the project.

The D&D WSRIC book is used to assist with waste characterization during D&D activities in Building 123. This book will describe the waste streams and provide characterization information to provide guidance for project personnel to segregate, package, and prepare the waste for receipt by Waste Disposal or for offsite shipment.

6.0 WASTE PACKAGING

LLW and LLM wastes generated by the project will be sorted at the time of removal. The waste will then be packaged and staged for further decontamination, survey, recycle, processing or packaging. Small quantities of LLW will be packaged in 55-gallon drums. Waste boxes will be used for packaging LLW. Waste Operations, in conjunction with the project, will designate the storage location for the LLW. It is expected that the majority of LLW will initially be transferred to an approved onsite storage at the site and will eventually be shipped to an offsite disposal facility. With proper approvals, it may be possible to ship the waste directly offsite.

DOT approved packages will be used to contain project generated waste that has been surveyed and packaged. Special packages may be used, under certain circumstances, to contain materials that may not fit into standard plywood boxes. The Project Manager will notify the affected waste management organization and obtain guidance if this occurs.
Non-contaminated recyclable materials, such as scrap metal, may be placed in boxes and later segregated into PU&D supplied bins for ease of removal. Additional items may be placed onto pallets for transfer to PU&D.

Liquid wastes drained from process lines or sumps may produce hazardous mixed wastes if radioactive contamination is detected. Unknown liquid wastes will be sampled. Aqueous wastes, if contaminated, will be sent to onsite treatment facilities. Although none are expected to remain, any hazardous organic chemicals will be treated as excess chemicals. They will be properly packaged, and sent offsite to an approved hazardous waste disposal site.

7.0 ONSITE STORAGE, TRANSPORTATION, AND FINAL DISPOSITION

Wastes that will not be shipped directly offsite will be relocated to an appropriate onsite storage as designated by Waste Operations. Waste Operations personnel will provide site surveillance support to ensure that hazardous and mixed wastes are being managed in accordance with the conditions established in the current Site RCRA Permit.

The RMRS Waste Disposal group and Traffic Management will be involved in developing the requirements for offsite transportation of waste to the selected disposal or treatment site. The Project Manager will comply with the Rocky Flats Transportation Safety Manuals to ensure all relevant transportation requirements are met.

8.0 WASTE MINIMIZATION

The philosophy of waste minimization will be utilized in the planning and management of project generated wastes. Standard decontamination operations and processes will be evaluated for waste minimization potential and suitable minimization techniques will be implemented. If the cost is greater to demonstrate that the item is not contaminated than to pay for waste disposal, the item will be disposed of as contaminated waste.

Opportunities for waste minimization through scrap metal recycle are dependent on successful decontamination operations confirmed through radiation surveys. Equipment will be decontaminated to the greatest extent practical then surveyed in support of waste minimization. Contamination survey data may result in partial or full release of a piece of equipment for scrap metal recycle.

9.0 COMPLETION REPORT

Upon completion of the project, a Project Completion Report will be prepared. This report will include a listing of the wastes removed from the building, characterization data, and waste dispositioning information (e.g., size reduction, decontamination, or treatment) which contributed to the final forms and volumes of the wastes resulting from this project.

10.0 REFERENCES

Hazardous Waste Requirements Manual

Health and Safety Plan, RFETS, Rev. 0, February 1996

RFETS Low-Level Waste Management Plan, 44-RWP/EWQA-0014, Rev. 1, 1996

Rocky Flats Transportation Safety Manuals

RMRS Waste Acceptance Criteria, Rev. 0, July 1996

Waste Stream and Residue Identification and Characterization, Building 123

Waste Stream and Residue Identification and Characterization for D&D

1-M12-WO-4034, *Radioactive Waste Packaging Requirements*

4-D99-WO-1101, *Solid Radioactive Waste Packaging Inside of the Protected Area*

1-10000-EWQA, *TSCA Management Plan*

1-C80-WO-1102-WRT, *Waste/Residue Traveler Instructions*

1-10000-WP-1024, *Asbestos Waste Management*

1-PRO-573-SWODP, *Sanitary Waste Offsite Disposal*

1-10000-EWQA, Section 1.5, *TSCA Management Plan*

1-E-8-WP-1027-NON-RAD, *Non-Radioactive Waste Packaging*

Attachment 15

Waste Generation Summary

This Attachment includes the following:

1. A Project Waste Tracking Log.

2. A Waste Generation Summary entitled *D&D WSRIC Process Closure Summary, Process #123-25*.

3. Example of a Waste Traveler for Industrial Waste which was shipped off-site to a Sanitary Landfill; due to the significant number of waste travelers, only a sample has been included in this report. Copies of all waste travelers are maintained in the project files, and in the Receiving Department at the B551 Warehouse.

4. A Waste and Environmental Management System (WEMS) report demonstrating proper container packaging of all hazardous, low-level, radioactive, and low-level mixed waste generated on the project.

5. A WEMS report demonstrating proper container staging of all hazardous, low-level radioactive, and low-level mixed waste generated on the project.

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 1

RMRS DWRC Waste Generator Ernie Bentsen / Lorenzo Casey Updated 4/30/98

DATE	IDC / WFC	CONTAINER TYPE	CONTAINER NUMBER	DATE CONTAINER FILLED	WASTE DESCRIPTION	WASTE STREAM NUMBER	SHIPPING DATE
9/11/97	326	Full Crate	P02682	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/12/97	326	Full Crate	P02683	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/15/97	326	Full Crate	P02684	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/15/97	326	Half Crate	H05538	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/16/97	326	Half Crate	H05540	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/17/97	326	Half Crate	H05541	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
9/17/97	326	Half Crate	H05542	9/18/97	Misc.Bldg Waste	D&D-3-68	10/7/97
11/17/97	861	55 Gal.Drum	D88759	12/18/97	Combustible / PPE	123-12-1	12/22/97
11/25/97	326	Full Crate	P02680	12/4/97	Misc. Bldg. Waste	D&D-3-68	12/9/97
12/4/97	1971	55 Gal. Drum	T00710	2/12/98	PCB Ballasts	D&D-1-31	3/11/98
12/9/97	480	Full Crate	P02804	12/9/97	Light Metal	D&D-3-11 D&D-3-13	12/17/97
12/10/97	480	Full Crate	P02863	12/10/97	Light Metal	D&D-3-11 D&D-3-13	12/17/97
12/10/97	480	Full Crate	P02857	12/10/97	Light Metal	D&D-3-11 D&D-3-13	12/17/97
1/6/98	480	Full Crate	P02795	1/6/98	Light Metal	D&D-3-11 D&D-3-13	1/15/98
12/11/97	480	Full Crate	P02858	12/11/97	Light Metal	D&D-3-11 D&D-3-13	12/17/97
12/16/97	438	Full Crate	P02796	12/16/97	Ceiling Tiles from RMMA Rooms	D&D-3-24	12/17/97
12/11/97	326	Full Crate	P02852	1/29/98	Misc. Bldg. Waste	D&D-3-68	2/12/98
12/12/97	480	5 Gal. Drum	X07400	12/12/97	Metal "unused shot"	D&D-4-11	12/15/97
11/11/97	862	55 Gal.Drum	D90479	11/11/97	Moist Combustibles With Asbestos	D&D-3-81	12/22/97
12/31/97	438	Full Crate	P02799	1/6/98	Asbestos counter tops / cabinets	D&D-3-76	1/15/98
12/10/97	480	Full Crate	P02853	12/10/97	Light Metal	D&D-3-11 D&D-3-13	12/17/97

BUILDING 123 D&D WASTE TRACKING LOG 97/98 *Page 2*							
DATE	*IDC / WFC*	*CONTAINER TYPE*	*CONTAINER NUMBER*	*DATE CONTAINER FILLED*	*WASTE DESCRIPTION*	*WASTE STREAM NUMBER*	*SHIPPING DATE*
12/31/97	480	Full Crate	P02861	1/6/98	Counter Tops / Cabinets	D&D-3-11 D&D-3-13	1/15/98
12/17/97	480	Full Crate	P02854	1/14/98	Counters Tops	D&D-3-11 D&D-3-13	1/22/98
1/6/98	480	Full Crate	P02794	1/6/98	Light Metal	D&D-3-11 D&D-3-13	1/15/98
1/8/98	480	Full Crate	P02847	1/8/98	Light Metal	D&D-3-11 D&D-3-13	1/15/98
1/9/98	853	Full Crate	P02859	2/21/98	Process Waste System	D&D-4-9	2/24/98
1/9/98	480	Full Crate	P02848	1/20/98	Light Metal	D&D-3-11 D&D-3-13	1/30/98
1/13/98	480	Full Crate	P02855	1/15/98	Light Metal	D&D-3-11 D&D-3-13	1/22/98
1/13/98	480	Full Crate	P02860	1/15/98	Light metal	D&D-3-11 D&D-3-13	1/22/98
1/13/98	480	Full Crate	P02849	1/16/98	Light Metal	D&D-3-11 D&D-3-13	1/22/98
1/15/98	861	Full Crate	P02862	1/16/98	Combustibles	D&D-3-3	1/22/98
1/12/98	861	Full Crate	P02851	1/16/98	Combustibles	D&D-3-3	1/22/98
1/17/98	861	Full Crate	P03019	2/3/98	Combustibles	D&D-3-3	2/12/98
1/17/98	480	Full Crate	P03020	1/19/98	Light Metal	D&D-3-11 D&D-3-13	1/30/98
1/18/98	480	Full Crate	P02846	1/19/98	Light Metal	D&D-3-11 D&D-3-13	1/22/98
1/17/98	480	Full Crate	P03017	1/19/98	Light Metal	D&D-3-11 D&D-3-13	1/22/98
1/7/98	480	Full Crate	P02864	2/14/98	Process Waste System	D&D-4-11	2/24/98
1/21/98	480	Full Crate	P03046	1/28/98	Light Metal	D&D-3-11 D&D-3-13	1/30/98
1/19/98	480	Full Crate	P03016	1/28/98	Light Metal	D&D-3-11 D&D-3-13	1/30/98
1/16/98	863	Full Crate	P02865	2/3/98	Plastic	D&D-3-9	2/12/98
1/7/98	438	Full Crate	P02802	2/3/98	Asbestos Panels	D&D-3-76	2/12/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 3

DATE	IDC / WFC	CONTAINER TYPE	CONTAINER NUMBER	DATE CONTAINER FILLED	WASTE DESCRIPTION	WASTE STREAM NUMBER	SHIPPING DATE
1/12/98	480	Full Crate	P02856	1/13/98	Light Metal	D&D-3-11 D&D-3-13	1/15/98
1/12/98	480	Full Crate	P02850	1/12/98	Light Metal	D&D-3-11 D&D-3-13	1/15/98
1/27/98	1966	Full Crate	P03064	1/22/98	Friable Asbestos PPE - Rags	D&D-1-22	3/5/98
1/29/98	480	Full Crate	P03084	1/30/98	Light Metal	D&D-3-11 D&D-3-13	2/13/98
1/29/98	480	Full Crate	P03059	1/29/98	Light Metal	D&D-3-11 D&D-3-13	2/12/98
1/30/98	1966	Full Crate	P03077	2/21/98	Friable Asbestos- PPE, Rags, TSI	D&D--22	3/5/98
1/29/98	480	Full Crate	P03065	1/29/98	Light Metal	D&D-3-11 D&D-3-13	2/12/98
1/23/98	438	Full rate	P03063	1/29/98	Asbestos Insulation & Floor Tile	D&D-3-76	1/30/98
1/29/98	480	Full Crate	P03066	1/29/98	Light Metal	D&D-3-11 D&D-3-13	2/13/98
2/2/98	480	Full Crate	P03082	2/2/98	Light Metal	D&D-3-11 D&D-3-13	2/13/98
2/3/98	863	Full Crate	P03081	2/3/98	Plastic	D&D-3-9	2/13/98
2/3/98	1971	55Gal.Drum	G04991	3/10/98	Non PCB Ballasts	D&D-1-31	3/11/98
2/3/98	1529	10Gal.Drum	X04299	2/9/98	Oil from out side pumps	D&D-1-36	To garage recycle drum 3/3/98
1/30/98	480	Full Crate	P03085	2/4/98	Light Metal	D&D-3-11 D&D-3-13	2/13/98
2/2/98	438	Full Crate	P03079	2/16/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/4/98	863	Full Crate	P03057	2/4/98	Plastic	D&D-3-9	2/13/98
2/4/98	863	Full Crate	P03061	3/6/98	Plastic	D&D-3-9	3/12/98
2/4/98	480	Full Crate	P03086	2/4/98	Light Metal	D&D-3-11 D&D-3-13	2/12/98
2/5/98	861	Full Crate	P03060	3/6/98	Combustibles	D&D-3-3	3/12/98
2/5/98	1971	55Gal.Drum	T00711	3/8/98	PCB Ballasts	D&D-3-31	3/11/98

BUILDING 123 D&D WASTE TRACKING LOG *97/98* *Page 4*

DATE	*IDC / WFC*	*CONTAINER TYPE*	*CONTAINER NUMBER*	*DATE CONTAINER FILLED*	*WASTE DESCRIPTION*	*WASTE STREAM NUMBER*	*SHIPPING DATE*
2/6/98	1971	55Gal.Drum	T00709	3/10/98	PCB Ballasts	D&D-3-31	3/11/98
2/16/98	438	Full Crate	P03058	2/17/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/12/98	852	55Gal.Drum	D90474	2/13/98	Moist Combustibles-Process waste sumps	D&D-4-6	3/9/98
2/4/98	480	Full Crate	P03080	2/4/98	Light Metal	D&D-3-11 D&D-3-13	2-12-98
2/19/98	438	Full Crate	P03147	2/21/98	Drywall	D&D-3-87	2/24/98
2/19/98	438	Full Crate	P03149	2/20/98	Drywall	D&D-3-87	2/24/98
2/20/98	438	Full Crate	P03151	2/21/98	Friable Asbestos	D&D-3-77	2/24/98
2/14/98	1321	Pallet	X09615	2/14/98	Lead Counter Weights	D&D-2-20	2/26/98
2/16/98	438	Full Crate	P03078	2/17/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/17/98	438	Full Crate	P03045	2/17/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/17/98	438	Full Crate	P03049	2/18/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/17/98	438	Full Crate	P03042	2/20/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/18/98	438	Full Crate	P03047	2/20/98	Asbestos Floor Tile	D&D-3-76	2/24/98
2/20/98	438	Full Crate	P03044	2/21/98	FriableAsbestos	D&D-3-26	2/24/98
2/13/98	480	Full Crate	P03051	2/18/98	Light Metal	D&D-3-11 D&D-3-13	2/24/98
2/13/98	438	Full Crate	P03050	2/21/98	Friable Asbestos	D&D-3-26	2/24/98
2/13/98	480	Full Crate	P03048	2/20/98	Light Metal	D&D-3-11 D&D-3-13	2/24/98
2/20/98	438	Full Crate	P03169	2/21/98	Friable Asbestos	D&D-3-26	2/24/98
2/20/98	438	Full Crate	P03167	2/21/98	Friable Asbestos	D&D-3-26	2/24/98
2/21/98	438	Full Crate	P03165	2/23/98	Drywall	D&D-3-87	2/24/98
2/21/98	438	Full Crate	P03162	3/26/98	Asbestos Floor Tile	D&D-3-76	3/30/98
2/4/98	480	Full Crate	P03083	2/5/98	Light Metal	D&D-3-11 D&D-3-13	2/12/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 5							
DATE	*IDC / WFC*	*CONTAINER TYPE*	*CONTAINER NUMBER*	*DATE CONTAINER FILLED*	*WASTE DESCRIPTION*	*WASTE STREAM NUMBER*	*SHIPPING DATE*
2/20/98	480	Full Crate	P03170	3/2/98	Light Metal	D&D-3-11 D&D-3-13	3/12/98
2/21/98	438	Full Crate	P03142	2/23/98	Drywall	D&D-3-87	3/3/98
2/21/98	1966	Full Crate	P03143	2/21/98	Friable Asbestos	D&D-1-22	3/5/98
2/21/98	1966	Full Crate	P03144	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03145	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03163	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03164	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03166	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03168	2/21/98	Friable Asbestos	D&D-1-22	3/12/98
2/21/98	1966	Full Crate	P03146	2/21/98	Friable Asbestos	D&D-1-22	3/5/98
2/23/98	438	Full Crate	P03150	2/23/98	Drywall	D&D-3-87	3/2/98
2/23/98	438	Full Crate	P03153	2/23/98	Drywall	D&D-3-87	3/2/98
2/24/98	438	Full Crate	P03180	2/24/98	Friable Drywall	D&D-3-77	3/3/98
2/24/98	438	Full Crate	P03158	2/24/98	Friable Drywall	D&D-3-77	3/2/98
2/17/98	480	Full Crate	P03062	2/24/98	Light Metal	D&D-3-11 D&D-3-13	3/2/98
2/24/98	438	Full Crate	P03185	2/24/98	Friable Drywall	D&D-3-77	3/2/98
2/24/98	438	Full Crate	P03157	2/24/98	Transite	D&D-3-77	3/2/98
2/24/98	438	Full Crate	P03188	2/24/98	Transite	D&D-3-77	3/5/98
2/24/98	438	Full Crate	P03182	2/24/98	Transite	D&D-3-77	3/2/98
2/24/98	438	Full Crate	P03184	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03186	2/26/98	Transite	D&D-3-77	3/2/98
2/26/98	438	Full Crate	P03159	3/18/98	Drywall	D&D-3-87	3/24/98
2/26/98	438	Full Crate	P03190	2/24/98	Friable Drywall	D&D-3-77	3/2/98
2/26/98	438	Full Crate	P03193	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/24/98	438	Full Crate	P03187	2/24/98	Friable Drywall	D&D-3-77	3/2/98
2/26/98	438	Full Crate	P03194	2/26/98	Friable Drywall	D&D-3-77	3/3/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 6

DATE	IDC / WFC	CONTAINER TYPE	CONTAINER NUMBER	DATE CONTAINER FILLED	WASTE DESCRIPTION	WASTE STREAM NUMBER	SHIPPING DATE
2/12/98	374	10 Gal. Drum	X04825	2/12/98	Dirt from scrubbers S1 & S3	D&D-4-53	3-10 To 750Haz-2205
2/20/98	480	Full Crate	P03171	2/21/98	Light Metal	D&D-3-11 D&D-3-13	2/24/98
2/26/98	438	Full Crate	P03192	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03195	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03199	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03198	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03189	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03200	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03201	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03191	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03179	2/26/98	Friable Drywall	D&D-3-77	3/3/98
2/26/98	438	Full Crate	P03197	2/26/98	Drywall	D&D-3-87	3/3/98
2/28/98	438	Full Crate	P03172	2/28/98	Transite	D&D-3-77	3/5/98
2/28/98	438	Full Crate	P03173	2/28/98	Transite	D&D-3-77	3/5/98
2/28/98	1966	Full Crate	P03174	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	438	Full Crate	P03175	2/28/98	Friable Drywall	D&D-3-77	3/5/98
2/27/98	1966	Full Crate	P03148	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	1966	Full Crate	P03154	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	438	Full Crate	P03196	2/28/98	Transite	D&D-3-77	3/5/98
2/26/98	438	Full Crate	P03178	2/20/98	Transite	D&D-3-77	3/3/98
3/4/98	438	Full Crate	P03247	3/4/98	Transite	D&D-3-77	3/10/98
3/3/98	438	Full Crate	P03242	3/4/98	Friable Drywall	D&D-3-77	3/10/98
3/4/98	438	Full Crate	P03243	3/4/98	Transite	D&D-3-77	3/10/98
3/2/98	438	Full Crate	P03203	3/2/98	Friable Insulation & Drywall	D&D-3-77	3/12/98
3/2/98	438	Full Crate	P03208	3/2/98	Friable Insulation & Drywall	D&D-3-77	3/10/98

BUILDING 123 D&D WASTE TRACKING LOG *97/98*

DATE	*IDC / WFC*	*CONTAINER TYPE*	*CONTAINER NUMBER*	*DATE CONTAINER FILLED*	*WASTE DESCRIPTION*	*WASTE STREAM NUMBER*	*SHIPPING DATE*
2/27/98	1966	Full Crate	P03152	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	1966	Full Crate	P03155	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	1966	Full Crate	P03161	2/28/98	Friable Asbestos	D&D-1-22	3/5/98
2/28/98	438	Full Crate	P03176	2/28/98	Transite	D&D-3-77	3/5/98
2/28/98	438	Full Crate	P03177	2/28/98	Friable Drywall	D&D-3-77	3/5/98
3/2/98	438	Full Crate	P03206	3/3/98	Friable Insulation & Drywall	D&D-3-77	3/10/98
3/2/98	438	Full Crate	P03204	3/4/98	Transite	D&D-3-77	3/10/98
3/4/98	438	Full Crate	P03211	3/4/98	Transite	D&D-3-77	3/10/98
3/4/98	438	Full Crate	P03252	3/4/98	Transite	D&D-3-77	3/10/98
3/4/98	438	Full Crate	P03255	3/4/98	Transite	D&D-3-77	3/10/98
3/6/98	1966	Full Crate	P03267	3/7/98	Friable Asbestos	D&D-1-22	3/10/98
3/6/98	861	Full Crate	P03275	3/20/98	Combustibles	D&D3-3	3/24/98
3/2/98	480	Full Crate	P03181	3/12/98	Light Metal	D&D-3-11 D&D-3-13	3/24/98
3/4/98	1966	Full Crate	P03202	3/5/98	Friable Asbestos	D&D-1-22	3/10/98
3/5/98	1966	Full Crate	P03207	3/5/98	Friable Asbestos	D&D-1-22	3/10/98
3/5/98	1966	Full Crate	P03209	3/6/98	Friable Asbestos	D&D-1-22	3/10/98
3/3/98	1966	Full Crate	P03210	3/4/98	Friable Asbestos	D&D-1-22	3/12/98
3/3/98	1966	Full Crate	P03244	3/5/98	Friable Asbestos	D&D-1-22	3/12/98
3/4/98	1966	Full Crate	P03253	3/5/98	Friable Asbestos	D&D-1-22	3/12/98
3/4/98	1966	Full Crate	P03254	3/5/98	Friable Asbestos	D&D-1-22	3/12/98
3/6/98	1966	Full Crate	P03268	3/6/98	Friable Asbestos	D&D-1-22	3/10/98
3/6/98	1966	Full Crate	P03270	3/6/98	Friable Asbestos	D&D-1-22	3/10/98
3/6/98	1966	Full Crate	P03273	3/6/98	Friable Asbestos	D&D-1-22	3/10/98
3/5/98	1966	Full Crate	P03274	3/5/98	Friable Asbestos	D&D-1-22	3/10/98
3/7/98	1966	Full Crate	P03271	3/9/98	Friable Asbestos	D&D-1-22	4/1/98
3/5/98	1966	Full Crate	P03269	3/5/98	Friable Asbestos	D&D-1-22	3/10/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 8

DATE	IDC / WFC	CONTAINER TYPE	CONTAINER NUMBER	DATE CONTAINER FILLED	WASTE DESCRIPTION	WASTE STREAM NUMBER	SHIPPING DATE
3/4/98	438	Full Crate	P03251	3/4/98	Transite	D&D-3-77	3/10/98
3/6/98	1966	Full Crate	P03276	3/7/98	Friable Asbestos	D&D-1-22	3/10/98
3/9/98	1966	Full Crate	P03272	3/10/98	Friable Asbestos	D&D-1-22	4/2/98
3/10/98	1966	Full Crate	P03261	3/12/98	Friable Asbestos	D&D-1-22	4/2/98
3/21/98	438	Full Crate	P03306	3/21/98	Friable Drywall	D&D-3-77	3/30/98
3/21/98	438	Full Crate	P03298	3/21/98	Friable Drywall	D&D-3-77	3/30/98
3/20/98	438	Full Crate	P03160	3/20/98	Transite	D&D-3-77	3/30/98
3/21/98	438	Full Crate	P03304	3/21/98	Friable Drywall	D&D-3-77	3/30/98
3/21/98	438	Full Crate	P03303	3/21/98	Friable Drywall	D&D-3-77	3/30/98
3/21/98	438	Full Crate	P03302	3/25/98	Friable Drywall	D&D-3-77	3/30/98
3/24/98	438	Full Crate	P03305	3/25/98	Transite	D&D-3-77	3/30/98
3/25/98	438	Full Crate	P03323	3/25/98	Transite	D&D-3-77	3/30/98
3/25/98	438	Full Crate	P03320	3/26/98	Floor Tile	D&D-3-76	3/30/98
3/24/98	438	Full Crate	P03312	3/24/98	Transite	D&D-3-77	3/30/98
3/23/98	438	Full Crate	P03315	3/24/98	Transite	D&D-3-77	3/30/98
3/24/98	438	Full Crate	P03311	3/34/98	Transite	D&D-3-77	3/30/98
3/23/98	438	Full Crate	P03307	3/24/98	Transite	D&D-3-77	3/30/98
3/16/98	438	Full Crate	P03258	3/20/98	Friable Drywall	D&D-3-77	3/30/98
3/24/98	438	Full Crate	P03324	3/25/98	Transite	D&D-3-77	3/30/98
3/20/98	438	Full Crate	P03250	3/20/98	Friable Drywall	D&D-3-77	3/30/98
3/3/98	438	Full Crate	P03245	3/20/98	Friable Drywall	D&D-3-77	3/30/98
3/4/98	438	Full Crate	P03249	3/12/98	Transite	D&D-3-77	3/24/98
3/16/98	438	Full Crate	P03266	3/16/98	Friable Drywall	D&D-3-77	3/24/98
3/16/98	438	Full Crate	P03263	3/16/98	Friable Drywall	D&D-3-77	3/24/98
3/16/98	438	Full Crate	P03262	3/16/98	Friable Drywall	D&D-3-77	3/24/98
3/16/98	438	Full Crate	P03257	3/16/98	Friable Drywall	D&D-3-77	3/24/98
3/23/98	438	Full Crate	P03314	3/24/98	Transite	D&D-3-77	3/30/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 9

DATE	IDC / WFC	CONTAINER TYPE	CONTAINER NUMBER	DATE CONTAINER FILLED	WASTE DESCRIPTION	WASTE STREAM NUMBER	SHIPPING DATE
3/20/98	438	Full Crate	P03205	3/23/98	Friable Drywall	D&D-3-77	3/24/98
3/21/98	438	Full Crate	P03308	3/23/98	Friable Drywall	D&D-3-77	3/24/98
3/23/98	438	Full Crate	P03316	3/23/98	Transite	D&D-3-77	3/24/98
3/20/98	438	Full Crate	P03300	3/23/98	Transite	D&D-3-77	3/24/98
3/21/98	438	Full Crate	P03309	3/23/98	Transite	D&D-3-77	3/24/98
3/16/98	438	Full Crate	P03259	2/16/98	Friable Drywall	D&D-3-77	3/24/98
3/20/98	438	Full Crate	P03156	3/23/98	Transite	D&D-3-77	3/24/98
3/21/98	438	Full Crate	P03310	3/21/98	Friable Drywall	D&D-3-77	3/24/98
3/21/98	438	Full Crate	P03297	3/21/98	Friable Drywall	D&D-3-77	3/24/98
3/17/98	438	Full Crate	P03260	3/20/98	Transite	D&D-3-77	3/24/98
3/21/98	438	Full Crate	P03301	3/21/98	Friable Drywall	D&D-3-77	3/24/98
3/20/98	438	Full Crate	P03159	3/17/98	Dry wall	D&D-3-87	3/24/98
3/23/98	1966	Full Crate	P03299	3/24/98	Friable Drywall	D&D-1-22	4/1/98
3/23/98	1966	Full Crate	P03325	3/25/98	Friable Drywall	D&D-1-22	4/1/98
3/23/98	1966	Full Crate	P03322	3/25/98	Friable Drywall	D&D-1-22	4/1/98
3/13/98	374	55 Gal.Drum	D90478	3/31/98	Scabbled Concrete	D&D-3-69	4/15/98
3/26/98	480	Full Crate	P03347	3/27/98	Light Metal	D&D-3-11	4/1/98
3/26/98	480	Full Crate	P03346	3/27/98	Light Metal	D&D-3-11 D&D-3-13	4/1/98
3/26/98	480	Full Crate	P03339	3/27/98	Light Metal	D&D-3-11 D&D-3-13	4/1/98
3/11/98	1966	Full Crate	P03265	3/12/98	Friable Asbestos	D&D-1-22	4/1/98
3/25/98	1966	Full Crate	P03319	3/27/98	Friable Asbestos	D&D-1-22	4/1/98
3/26/98	1966	Full Crate	P03348	3/27/98	Friable Asbestos	D&D-1-22	4/1/98
3/27/98	1966	Full Crate	P03345	3/27/98	Friable Asbestos	D&D-1-22	4/1/98
3/30/98	1966	Full Crate	P03344	3/30/98	Friable Asbestos	D&D-1-22	4/1/98
3/30/98	1966	Full Crate	P03313	3/30/98	Friable Asbestos	D&D-1-22	4/2/98
3/16/98	438	Full Crate	P03264	3/16/98	Friable Drywall	D&D-3-77	3/24/98

BUILDING 123 D&D WASTE TRACKING LOG 97/98 Page 10							
DATE	*IDC / WFC*	*CONTAINER TYPE*	*CONTAINER NUMBER*	*DATE CONTAINER FILLED*	*WASTE DESCRIPTION*	*WASTE STREAM NUMBER*	*SHIPPING DATE*
3/26/98	1966	Full Crate	P03343	3/27/98	Friable Asbestos	D&D-1-22	4/1/98
3/30/98	1966	Full Crate	H05814	3/31/98	Friable Asbestos	D&D-1-22	4/2/98
3/31/98	863	Full Crate	P03349	4/10/98	Plastic	D&D-3-9	4/20/98
3/26/98	480	Full Crate	P03340	3/27/98	Light Metal	D&D-3-11 D&D-3-13	4/1/98
4/2/98	374	55 Gal.Drum	D90476	4/14/98	Scabbled Concrete	D&D-3-69	4/15/98
3/25/98	438	Full Crate	P03326	4/10/98	Transite	D&D-3-77	4/21/98
4/22/98	863	55 Gal Drum	D87186	4/24/98	Plastic	D&D-3-9	4/27/98
4/22/98	480	55 Gal Drum	D90475	4/22/98	Light Metal	D&D-3-13	4/27/98
4/22/98	862	55 Gal Drum	D87183	4/24/98	Moist Combustibles	D&D-3-6	4/27/98
4/22/98	374	55 Gal Drum	D90477	4/24/98	Scabbled Concrete / Cinderblock	D&D-3-70	4/27/98
4/23/98	862	55 Gal Drum	D87184	4/24/98	Moist Combustibles	D&D-3-6	4/27/98
4/24/98	862	55 Gal Drum	D86973	4/24/98	Moist Combustibles	D&D-3-6	4/27/98
5/1/98	1966	Full Crate	P03407	5/1/98	Friable Asbestos	D&D-1-22	5/5/98

D&D WSRIC Process Closure Summary
Process # 123-25

The Construction Management / D&D group has completed the Deactivation, Decommissioning, and Demolition of building 123 under Integrated Work Control Package (IWCP)# FB-0410, using the D&D WSRIC book to document the characterization of the waste generated during this activity. Characterization was based upon various project documents, including the Reconnaissance Level Characterization Report, Asbestos and Lead Characterization Report, Closure Plan for Building 123 Components of RCRA Unit 40, Proposed Action Memorandum for the Decommissioning of Building 123, Waste Management Plan, analytical sampling, process knowledge, and interviews with building residents.

The purpose of this document is to provide a summary of the waste that was generated from these activities. The D&D activities included the removal of all equipment that was abandoned by building personnel in July 1997. Most salvageable items were sent to PU&D and not captured by this summary. Miscellaneous items not fully surveyable from RMMA rooms were disposed of as LLW. Excess chemicals were collected and disposed of by Radian under a contract to Kaiser Hill. Buildings 113, 114, and 123S were included in the scope of this D&D work package.

The stripout started in August of 1997, and demolition started in April 1998. The last waste to be shipped from the site was May 28, 1998. Waste types and volumes generated from the project include:

Radioactive Waste	**665.54 cubic yards**
Straight Low Level Waste (LLW) (9) 55 gal drums, (64) full crates, (4) half crates	275.71 cubic yards
Low Level Asbestos Waste (LLW) (1) 55 gal drum, (92) full crates	381.15 cubic yards
Low Level Mixed Waste (LLM) (1) 5 gal drum, (2) 10 gal drums, (1) 55 gal drum, (2) full crates	8.68 cubic yards

Non-Radioactive Waste	**4,733.58 cubic yards**
Hazardous Waste (HAZ) (5) small bags, (22) boxes	3.25 cubic yards
Non-Rad, Non-Haz Friable Asbestos (NON) (44) full crates, (1) half crate	184.23 cubic yards
Non-Rad, Non-Haz Special Waste (ballasts) (NON) (4) 55 gal drums	1.1 cubic yards
Industrial Sanitary Waste (Stripout) (NON) (12) rolloffs	360 cubic yards
Industrial Sanitary Waste (Demolition) (NON) (200) rolloffs	4,095 cubic yards
Special Sanitary Waste (Non-Friable Asbestos) (NON) (3) rolloffs	90 cubic yards

Material to Recycle	**490.5 cubic yards**
Recycle Metal (Stripout) (6) rolloffs	210 cubic yards
Recycle Metal (Demolition) (8) rolloffs	280 cubic yards
Other Recycle Material 1) box (Pb acid batteries), (1)10 gal drum (oil), (1) pallet (lead weights)	.5 cubic yards

Number of containers shipped from Building 123

Rolloffs	229 Total - 0 Rad, 229 Non-Rad
Full Crates	202 Total - 158 Rad, 44 Non-Rad
Half Crates	5 Total - 4 Rad, 1 Non-Rad
55 gallon drums	15 Total - 11 Rad, 4 Non-Rad
Odd Size Containers	33 Total - 3 Rad, 30 Non-Rad

A summary of the wastes generated during D&D is listed below. It is arranged in D&D WSRIC process/output number sequence, which segregates waste types. These processes are as follows:

D&D-1	Non-Hazardous and Non-Radioactive (NON)
D&D-2	Hazardous and Non-Radioactive (HAZ)
D&D-3	Non-Hazardous and Radioactive (LLW)
D&D-4	Hazardous and Radioactive (LLM)

NON-Hazardous & Non-Radioactive Waste Outputs (NON)

D&D-1-1 Combustibles
No WGI required (1) 55 gallon bag
This output is characterized as non-hazardous by process knowledge, and consists of PPE generated during an attempt to strip paint from the south wall in room 111. It did not come in contact with hazardous material, and was disposed of in a rolloff going to USA landfill.

D&D-1-4 Scrap Metal
No WGI Required (14) rolloffs - 490 cu. yds. - 122.06 tons
Characterized by process knowledge as non-hazardous, recyclable material. Six rolloffs were sent to Gahagan Metal and Iron, and eight rolloffs were sent to Newell Recycling for salvage. This waste output included piping, conduit, stainless steel ducting, copper piping, ventilation ducting, metal wall studs, and other various metal items. The metal had been size reduced to ensure efficient use of space in the rolloff.

D&D-1-14 Fluorescent Light Bulbs - Non Hazardous
No WGI required (5) boxes
This output consists only of the four foot green tipped fluorescent light bulbs. These are characterized as non hazardous by RFETS guidance. They were disposed of in sanitary waste rolloff sent to USA landfill.

D&D-1-20 Non-Friable Asbestos
WGI #GI9701230342A (3) rolloffs or 70 cu. yds.
This waste was certified as being non-friable asbestos waste by the project state certified asbestos inspector. It consisted of doors with

asbestos cores, stainless steel countertops with asbestos mastic on the bottom, transite panels removed from above the windows on the outside of the building, and other assorted non-friable asbestos items. Two full and one partial 30 cubic yard rolloff was generated by AFIC the asbestos abatement contractor.

D&D-1-22 Friable Asbestos Waste Material
WGI #GI9801230471B (44) full crates & (1) half crate
Characterized as containing friable asbestos by AFIC the abatement contractor, and the RMRS project certified asbestos professional. This waste consisted of PPE, plastic containment sheeting, metal, wood, rags, vermiculite, cinder block, thermal system insulation (TSI) from non-rad areas, and other items that were in the asbestos containment area that could not be wiped clean of asbestos fibers.

D&D-1-31 Non-Leaking Light Ballasts (PCB)
WGI #GI9701230197B (3) 55 gallon drums
Characterized by process knowledge and visually inspected to ensure they were not labeled 'Non-PCB' ballasts and capacitors. These potential PCB ballasts were packaged from the stripout of lighting fixtures in all rooms of building 123 and 113.

D&D-1-31 Non-Leaking Light Ballasts (Non-PCB)
WGI #GI9701230187A (1) 55 gallon drum
Characterized by process knowledge and visually inspected to ensure they have 'Non-PCB' labeled on the ballast. These PCB free ballasts were packaged from the stripout of lighting fixtures in all rooms of building 123 and 113.

D&D-1-36 Misc. Organic Liquid
No WGI required (1) 10 gallon drum
This output consists of five bottles of Di-2-ethylhexyl Phosphoric Acid that was abandoned by the building. Analytical data (98A0090 and 97P2294) shows these wastes are non-hazardous and non-radioactive. They were packed into drum X01810 and sent to Unit 5001 PU&D.

D&D-1-45 Industrial Sanitary Waste (Non-Routine)
WGI # GI9701230199B (215) rolloffs

4,545 cubic yards **1757 tons**

This waste output includes all waste that was solid, non-radioactive, non-hazardous. During the stripout phase it consisted of items such as ceiling tiles, carpeting and fixtures from Non-RMMA rooms, surveyable items from RMMA rooms, Non-Friable asbestos items, and items on the outside of the building. There were (15) 30 cubic yard rolloffs of this non-structural waste. During the demolition phase it consisted of concrete, cinderblock, rebar, roofing material and other metal and wood building pieces. There were (200) 30 cubic yard rolloffs of this structural debris. All industrial sanitary waste was sent to USA landfill in Erie, Colorado.

Hazardous & Non-Radioactive Waste Outputs (HAZ)

D&D-2-4 Chrome Wire
No WGI required **(1) box**

This waste output was found in the building during the stripout, and consists of a roll of unused chrome wire. The manufacturer label states that chrome is a constituent of the metal.

D&D-2-6 Nicad Batteries
No WGI required **(1) box**

This output consists of dry cell nicads that were characterized by process knowledge. These batteries were removed from various pieces of equipment during the stripout of the building. .

D&D-2-10 Lead Acid Batteries
No WGI required **(1) box**

This output consists of various lead acid batteries found in emergency lighting throughout the building. They were sent to PU&D Unit 5001 as recycle material.

D&D-2-16 Incandescent Light Bulbs
No WGI required **(1) box**

This output consists of incandescent light bulbs removed from various fixtures that were stripped out of the building. These were characterized as hazardous by process knowledge.

D&D-2-17 Mercury Thermometers and Thermostat
No WGI required (1) box
This waste output consists of four thermometers found in various equipment in the building, and one thermostat from building 113. These were characterized as hazardous by process knowledge.

D&D-2-20 Lead Counterweights and Bricks
No WGI required (1) Pallet
This waste consisted of lead counterweights that were removed from laboratory hoods. These were connected to the front windows by a cable, and were enclosed in a metal runway. They were surveyed for free release and sent for recycle to PU&D Unit 5001. The lead bricks were given to Rad Eng for use in shielding a counter in T891R.

D&D-2-22 Fluorescent Light Bulbs
No WGI required (21) boxes
This output consists of light bulbs that are four and eight foot and "U" shaped, and do not have the green tips. They are characterized as hazardous by process knowledge.

D&D-2-31 Paint Chips
No WGI required (2) packages
One package of lead based paint chips was generated in room 109B. This characterization is supported by the building lead characterization report, which shows paint on the walls has lead at levels of 10-4000 PPM (total analysis).
A second package of paint chips was generated after the bldg. was demolished. These chips were collected from the slab where the restroom/lockerrooms and janitor closet were located in the north wing, rooms 113, 113A, 113B, 115, 119 and 119A. The lead characterization report shows levels of chromiun from 260-2,600 PPM and lead from 90-3,700 PPM (total analysis).

Non-Hazardous & Radioactive Waste Outputs (LLW)

D&D-3-3 Dry Combustibles
WGI #GI9701230299A (5) full crates

This waste consists of various combustible items, including PPE, wood, and other combustible material. Visual inspection and process knowledge verified that there were no hazardous constituents in this waste.

D&D-3-6 Moist Combustibles
WGI #GI9701230307A (3) 55 gallon drums
This waste output consists of combustibles such as PPE, kimwipes, and absorbent that are wetted. They were generated during the scabbling of paint from the south wall in room 111. Visual inspection and process knowledge verified that there were no hazardous constituents added to this waste.

D&D-3-9 Plastics
WGI #GI9701230300B (5) full crates & (1) 55 gallon drum
This waste output consists of various plastic type items that include plastic bags, hoses, containers, PPE, plastic containment sheeting, and other plastic type items. Visual inspection and process knowledge verified that there were no hazardous constituents added to this waste.

D&D-3-11 Light Metal
WGI #GI9701230400A (40) full crates
This output consists of metal counters, cabinet, piping, hoods, angle iron, and various metal items that could not surveyed for free release. It was packaged with output D&D-3-13, which consists of the same waste items with lead based paint on it.

D&D-3-13 Light Metal w/ Lead Paint-Non-RCRA
WGI #GI9701230400A (see output 3-11 above)
WGI #GI9801230619A (1) 55 gallon drum
This output consists of the same metal items as in output D&D-3-11, with the addition of lead based paint that is below RCRA TCLP levels on it. Items with painted surfaces in RMMA rooms were considered radioactive.

D&D-3-24 Insulation (Ceiling Tile)
WGI #GI9701230345A (1) full crate
This output consists of ceiling tiles generated in RMMA rooms. According to the Bldg. 123 Asbestos Characterization Report, these ceiling tiles do not contain any asbestos material.

D&D-3-26 Asbestos Friable
WGI #GI9801230466B (4) full crates
This output consists of various friable asbestos items that were certified as being friable by the project state certified asbestos professional. This included vermiculite and foam glass with vermiculite on it from room 165, and drywall with mud that did not have lead based paint on it.

D&D-3-68 Mixed IDC's
No WGI required (6) full crates & (4) half crates
This waste was generated before Waste Generator Instructions were issued. The waste consists of metal, plastic, glass, and combustibles. Visual inspection and process knowledge verified that there were no hazardous constituents as part of this waste type.

D&D-3-69 Scabbled Concrete
WGI #GI9801230527B (2) 55 gallon drums
This waste consists of bags of concrete that was scabbled from the floor and wall to remove radioactive contamination. It was generated in rooms 105, 109, 123, 124 and 124A. This waste is characterized by process knowledge as being non hazardous. No lead based paint was on this concrete.

D&D-3-70 Scabbled Concrete
WGI #GI9801230624A (1) 55 gallon drum
This waste consists of bags of concrete, cinder block and paint that was scabbled from the wall to remove radioactive contamination. It was generated in room 111 on the south wall. This waste is characterized by process knowledge as being non hazardous since the lead based paint on this concrete was below RCRA TCLP levels.

D&D-3-76 Asbestos, Non-Friable
WGI # GI9701230284B (12) full crates
This waste consists of non-friable asbestos material, including floor tile, cabinet panels, and countertops with mastic that were unsurveyable. These items were certified non-friable by the project state certified asbestos inspector. They did not have any lead based paint on them.

D&D-3-77 Non-Friable Asbestos Insulation w/ Lead Paint
WGI #GI9701230284B (31) full crates
This output consists of non-friable asbestos material such as transite wall board, and was certified non-friable by the project state certified asbestos inspector. It also has lead based paint on it below RCRA TCLP levels.

D&D-3-77 Friable Asbestos Insulation w/ Lead Paint
WGI #GI9701230466B (43) full crates
This output consists of drywall that has asbestos mud attached to it, so it is considered friable asbestos. The drywall also has lead based paint on it below RCRA TCLP levels.

D&D-3-81 Moist Combustibles with Asbestos
WGI #GI9701230186A (1) 55 gallon drum
This waste consists of moist combustibles that were generated during the cleanup of friable asbestos contamination on the floor below where sampling of asbestos occurred.

D&D-3-87 Drywall w/ Lead Paint
WGI #9801230505A (9) full crates
This output consists of drywall that did not have asbestos mud in the joints. This waste has lead based paint below RCRA TCLP levels on its surface.

Hazardous & Radioactive Waste Outputs (LLM)

D&D-4-6 Moist Combustibles
WGI # GI9701230261A (1) 55 gallon drum
This waste consists of kimwipes and rags that were used to wipe down the sumps that were part of the process waste system RCRA unit 40. There was no sludge buildup in these sumps before they were wiped. Characterization is the same as the process waste system for the building, which is F001, F002, F005.

D&D-4-9 Plastic Process Waste System
WGI # GI9701230258A (1) full crate
This output consists of PVC process waste piping that was removed from RCRA Unit 40 in bldg. 123. There also are some plastic secondary containment pans and pumps that are mostly plastic. Characterization is based upon RCRA Unit 40, minus the "F" codes associated with cyanide processes since they were not used in bldg. 123, and also the "D" codes are not applicable since no sludge was present in the waste that was packaged.

D&D-4-11 Metal Process Waste Pipes
WGI # GI9801230325A (1) full crate
This output consists of metal process waste piping from RCRA Unit 40 removed from bldg. 123. There also are some metal secondary containment pans. Characterization is based upon RCRA Unit 40, minus the "F" codes associated with cyanide processes since they were not used in bldg. 123, and also the "D" codes are not applicable since no sludge was present in the waste that was packaged.

D&D-4-11 Light Metal
No WGI required (1) 5 gallon drum
This output consists of a bag labeled "unused shot" that was found abandoned in the building. This material was sampled under analysis #98A0018 and found to be hazardous for chrome.

D&D-4-14 Circuit Boards
No WGI required (1) 10 gallon drum
This output consists of circuit boards that came from various pieces of equipment that were being stripped out. They could not be free released due to not being 100% surveyable. They were characterized by RFETS guidance as hazardous waste.

D&D-4-53 Dirt from Scrubbers S-1 & S-3
No WGI required (1) 5 gallon drum
This waste is dirt with no free liquid from the bottom of the S-1 and S-3 scrubbers in the courtyard of bldg. 123. Analysis #98A1320 verifies that this soil is hazardous due to traces of the following organics; Methylene Chloride, Trichloroethylene and Methyl Ethyl Ketone, which were used as

lab solvents. MDA results show that this soil does not meet the free release criteria.

Formerly RF32280

BILL OF LADING
SECURITY/DEPARTMENT COPY

**Shipper's No. (5)

CARRIER: Vendor Pickup

RECEIVED: subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading,
FROM: DYNCORP OF COLORADO, INC. AT ROCKY FLATS, COLO., 80007
FOR: U.S. Department of Energy
Rocky Flats Environmental Technology Site May, ~~4~~ 14 1998 B/L No. **047075**
Kaiser-Hill Contracting Team

the property described below, in apparent good order, except as noted (contents and conditions of contents of packages unknown), marked, consigned and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place at said destination, if on its route, otherwise deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail - water shipment, or (2) in the applicable motor carrier classification or tariff, it this is a motor carrier shipment, or (3) in the Uniform Railway Express Receipt, if this is a railway or express shipment, or (4)in the Uniform Airbill, if this is an air freight shipment

Shipper hereby certifies that he is familiar with all the terms and conditions of the said Bill of Lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned To and Destination (Mail or street address of Consignee— For purpose of notification only.)

USA Waste Services, Inc.
Front Range Landfill
Erie, CO 80516

EMERGENCY CONTACT
(303) 966-2914

Seal Numbers ____________

Vehicle or Car Initial & No. ____________

Route Vendor Pickup

No. Packages	HM	Description of Articles, Special Marks and Exceptions	*WEIGHT (Sub. to Cor.)	Class or Rate	** SS 741 Reference
1 TL		Sanitary Solid Waste Truck Number 307 Container Number 30-303 Gross Weight 45320 lbs. NOTE: This Material Is From Bldg.123 4 Master RO/SM# 07644 Contractor ~~Rocky Mountain Remedi~~ation Services	16184 lbs ~~30~~ 20		** Job Order No. Reference ~~A5H0410/R3202~~ ~~EA070271~~ ** Buyer's Order No. RM708014GM3 If charges ar to be pre paid, write or stamp here, "To be Pre-paid." Collect NOTE: Where the rate is dependent on value, shippers are required to state specifically, in writing, the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding: _____ Per _____ Subject to Section 7 of conditions, if this shipment is to delivered to the con signee without recourse on the consignor, the consign or shall sign the following statement. The carrier shall not make delivery of this ship ment without payment of freight and all other lawful charges. DYNCORP OF COLORADO, Inc. FOR: U.S. Department of Energy (Signature of Consignor) *If the shipment moves between two ports by a carrier by water, the law requires that the Bill of Lading shall state whether it is "carrier's or shipper's weight."

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation, according to the applicable regulations of the Department of Transportation.

**Shipper's imprint in lieu of stamp; not a part of Bill of Lading approved by the Interstate Commerce Commission

DYNCORP OF COLORADO, INC. shipper, A Contractor for the U.S. Department of Energy, Contract DE-RP34-94RF00825 ____________ Agent

Per ____________ SK Per ____________

Permanent Post Office address of Shipper: P.O. Box 464, GOLDEN, COLO., 80402-0464

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
D86793	A	LLW	DRO	123	GI9701230307A	DRUM 2 PLASTIC
D87183	A	LLW	DRO	123	GI9701230307A	DRUM 2 PLASTIC
D87184	A	LLW	DRO	123	GI9701230307A	DRUM 2 PLASTIC
D87186	A	LLW	DRO	123	GI9701230300B	DRUM 2 PLASTIC
D88759	A	LLW	DRO	123		DRUM 2 PLASTIC
D90474	A	LLM	DRO	123	GI9701230261A	DRUM 2 PLASTIC
D90475	A	LLW	DRO	123	GI9801230619A	55-GAL FIBERBOARD DRUM 2 PLASTIC
D90476	A	LLW	DRO	123	GI9801230527B	55-GAL FIBERBOARD DRUM 2 PLASTIC
D90477	A	LLW	DRO	123	GI9801230624A	55-GAL FIBERBOARD DRUM 2 PLASTIC
D90478	A	LLW	DRO	123	GI9801230527A	55-GAL FIBERBOARD DRUM 2 PLASTIC
D90479	A	LLW	DRO	123	GI9701230186A	DRUM 2 PLASTIC
D90760	A	LLW	DRO	123		DRUM 1 PLASTIC 55-GAL FIBERBOARD
H05538	A	LLW	BHW	123	GI9801230689A	1/2 BOX FIBERBRD 1/2 BOX PVC LINER
H05540	A	LLW	BHW	123	GI9801230689A	1/2 BOX FIBERBRD 1/2 BOX PVC LINER
H05541	A	LLW	BHW	123	GI9801230689A	1/2 BOX FIBERBRD 1/2 BOX PVC LINER
H05542	A	LLW	BHW	123	GI9801230689A	BOX FIBERBOARD BOX PVC LINER 1/2 BOX PVC LINER 1/2 BOX FIBERBRD
P02680	A	LLW	BFW	123	GI9801230689A	BOX FIBERBOARD BOX PVC LINER
P02682	A	LLW	BFW	123	GI9801230689A	BOX FIBERBOARD BOX PVC LINER
P02683	A	LLW	BFW	123	GI9801230689A	BOX FIBERBOARD BOX PVC LINER
P02684	A	LLW	BFW	123	GI9801230689A	BOX FIBERBOARD BOX PVC LINER
P02794	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD BOX PVC LINER
P02795	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD BOX PVC LINER
P02796	A	LLW	BFW	123	GI9701230345A	BOX FIBERBOARD BOX PVC LINER
P02799	A	LLW	BFW	123	GI9701230284A	BOX FIBERBOARD BOX PVC LINER
P02802	A	LLW	BFW	123	GI9701230284A	BOX FIBERBOARD BOX PVC LINER
P02804	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD BOX PVC LINER
P02846	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
						BOX PVC LINER
P02847	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02848	A	LLW	BFW	123	GI9701230284A	BOX FIBERBOARD
						BOX PVC LINER
P02850	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02851	A	LLW	BFW	123	GI9701230299A	BOX FIBERBOARD
						BOX PVC LINER
P02852	A	LLW	BFW	123	GI9801230689A	BOX FIBERBOARD
						BOX PVC LINER
P02853	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02854	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02855	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02856	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02857	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02858	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02859	A	LLM	BFW	123	GI9701230258A	BOX FIBERBOARD
						BOX PVC LINER
P02860	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02861	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02862	A	LLW	BFW	123	GI9701230299A	BOX FIBERBOARD
						BOX PVC LINER
P02863	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P02864	A	LLM	BFW	123	GI9801230325A	BOX FIBERBOARD
						BOX PVC LINER
P02865	A	LLW	BFW	123	GI9701230300A	BOX FIBERBOARD
						BOX PVC LINER
P03016	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03019	A	LLW	BFW	123	GI9701230299A	BOX FIBERBOARD
						BOX PVC LINER
P03020	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03042	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03044	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
					GI9801230466B	BOX PVC LINER
					GI9701230284B	BOX PVC LINER

Waste Generated in Building 123
Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
					GI9801230466B	BOX FIBERBOARD
P03045	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03046	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03047	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03048	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03049	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03050	A	LLW	BFW	123	GI9801230466A	BOX FIBERBOARD
						BOX PVC LINER
P03051	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03057	A	LLW	BFW	123	GI9701230300B	BOX FIBERBOARD
						BOX PVC LINER
P03058	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03059	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03060	A	LLW	BFW	123	GI9701230299A	BOX FIBERBOARD
						BOX PVC LINER
P03061	A	LLW	BFW	123	GI9701230300B	BOX FIBERBOARD
						BOX PVC LINER
P03062	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03063	A	LLW	BFW	123	GI9701230284A	BOX FIBERBOARD
						BOX PVC LINER
P03065	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03066	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03078	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03079	A	LLW	BFW	123	GI9701230284A	BOX FIBERBOARD
						BOX PVC LINER
P03080	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03081	A	LLW	BFW	123	GI9701230300A	BOX FIBERBOARD
						BOX PVC LINER
P03082	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03083	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03084	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03085	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
						BOX PVC LINER
P03086	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03142	A	LLW	BFW	123	GI9802130505A	BOX FIBERBOARD
						BOX PVC LINER
P03147	A	LLW	BFW	123	GI9801230505A	BOX FIBERBOARD
						BOX PVC LINER
P03149	A	LLW	BFW	123	GI9801230505A	BOX FIBERBOARD
						BOX PVC LINER
P03150	A	LLW	BFW	123	GI9801230505A	BOX FIBERBOARD
						BOX PVC LINER
P03151	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
					GI9801230466B	BOX PVC LINER
						BOX FIBERBOARD
P03153	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03156	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03157	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03158	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03159	A	LLW	BFW	123	GI9801230505A	BOX FIBERBOARD
						BOX PVC LINER
P03160	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03162	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03165	A	LLW	BFW	123	GI9801230505A	BOX FIBERBOARD
						BOX PVC LINER
P03167	A	LLW	BFW	123	GI9801230466A	BOX FIBERBOARD
						BOX PVC LINER
P03169	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03170	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03171	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03172	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03173	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03175	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03176	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03177	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
P03178	A	LLW	BFW	123	GI9801230505A	BOX PVC LINER BOX FIBERBOARD
P03179	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03180	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03181	A	LLW	BFW	123	GI9701230400A	BOX PVC LINER BOX FIBERBOARD
P03182	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03183	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03184	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03185	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03186	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03187	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03188	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX PVC LINER
P03189	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD BOX FIBERBOARD
P03190	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03191	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03192	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03193	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03194	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03195	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03196	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03197	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03198	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03199	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03200	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03201	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
P03203	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03204	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03205	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03206	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03208	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03211	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03242	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03243	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03245	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03247	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03249	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03250	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03251	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03252	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03255	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03258	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03260	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03275	A	LLW	BFW	123	GI9701230299A	BOX PVC LINER BOX FIBERBOARD
P03297	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03298	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03300	A	LLW	BFW	123	GI9701230284B	BOX PVC LINER BOX FIBERBOARD
P03301	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03302	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD
P03303	A	LLW	BFW	123	GI9801230466B	BOX PVC LINER BOX FIBERBOARD

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
						BOX PVC LINER
P03304	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03305	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03306	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03307	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03308	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03309	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03310	A	LLW	BFW	123	GI9801230466B	BOX FIBERBOARD
						BOX PVC LINER
P03311	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03312	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03314	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03315	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03316	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03320	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03321	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03323	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03324	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03326	A	LLW	BFW	123	GI9701230284B	BOX FIBERBOARD
						BOX PVC LINER
P03339	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03340	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03346	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03347	A	LLW	BFW	123	GI9701230400A	BOX FIBERBOARD
						BOX PVC LINER
P03349	A	LLW	BFW	123	GI9701230300B	BOX FIBERBOARD
						BOX PVC LINER
W12487	S	HAZ	CXC	123		
W12489	S	HAZ	CXC	123		
W12490	S	HAZ	CXC	123		

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Cntnr Type	Gen Bldg	WGI Number	Liner Type
W12491	S	HAZ	CXC	123		
W12493	S	HAZ	CXC	123		
X01814	A	LLM	DTG	123		DRUM 1 PLASTIC
X04825	A	LLM	DTG	123		DRUM 2 PLASTIC
X07093	A	LLW	DFG	123		DRUM 2 PLASTIC
X07094	A	LLW	DFG	123		DRUM 2 PLASTIC
X07098	A	LLM	DFG	123		DRUM 2 PLASTIC
X07400	A	LLM	DTG	123		

total 178 containers

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
D86793	A	LLW	123	020	750HAZ	18-Mar-96
				750HAZ	123	27-Apr-98
				123	750HAZ	27-Apr-98
D87183	A	LLW	123	020	750HAZ	8-May-96
				750HAZ	750HAZ	21-Apr-98
				750HAZ	123	23-Apr-98
				123	750HAZ	27-Apr-98
D87184	A	LLW	123	020	750HAZ	8-May-96
				750HAZ	750HAZ	16-Apr-98
				750HAZ	123	23-Apr-98
				123	750HAZ	27-Apr-98
D87186	A	LLW	123	020	750HAZ	8-May-96
				750HAZ	750HAZ	16-Apr-98
				750HAZ	123	23-Apr-98
				123	750HAZ	27-Apr-98
D88759	A	LLW	123	020	123	11-Feb-97
				123	123	3-Mar-97
				123	664	22-Dec-97
				664	444C	14-Jan-98
				444C	440	21-Jan-98
				440	444C	13-Mar-98
D90474	A	LLM	123	551	123	21-Aug-97
				123	123	2-Dec-97
				123	123S	2-Feb-98
				123S	664	9-Mar-98
				664	906	13-Mar-98
D90475	A	LLW	123	551	123	21-Aug-97
				123	123	2-Jan-98
				123	123	2-Jan-98
				123	123	9-Mar-98
				123	666	11-Mar-98
				666	750HAZ	21-Apr-98
				750HAZ	750HAZ	21-Apr-98
				750HAZ	750HAZ	21-Apr-98
				750HAZ	750HAZ	21-Apr-98
D90476	A	LLW	123	551	123	21-Aug-97
				123	123	2-Dec-97
				123	123	9-Mar-98
				123	666	11-Mar-98
				666	123	1-Apr-98
				123	664	15-Apr-98
D90477	A	LLW	123	123	123	14-Feb-98
				123	123	9-Mar-98
				123	666	11-Mar-98
				666	750HAZ	21-Apr-98
				750HAZ	123	23-Apr-98
				123	750HAZ	27-Apr-98

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
D90478	A	LLW	123	123	123	14-Feb-98
				123	123	9-Mar-98
				123	664	15-Apr-98
D90479	A	LLW	123	551	123	21-Aug-97
				123	123	2-Dec-97
				123	664	22-Dec-97
				664	444C	14-Jan-98
				444C	444C	20-Jan-98
				444C	664	21-Jan-98
				664	444C	27-Jan-98
D90760	A	LLW	123	551	750HAZ	22-Sep-97
				750HAZ	881	3-Nov-97
				881	123S	2-Dec-97
				123S	664	22-Dec-97
				664	444C	14-Jan-98
				444C	444C	20-Jan-98
H05538	A	LLW	123	551	123	13-Aug-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
H05540	A	LLW	123	551	123	13-Aug-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
H05541	A	LLW	123	551	123	13-Aug-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
H05542	A	LLW	123	551	123	13-Aug-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
P02680	A	LLW	123	551	123	3-Sep-97
				123	123	13-Oct-97
				123	664C	9-Dec-97
P02682	A	LLW	123	551	123	3-Sep-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
P02683	A	LLW	123	551	123	3-Sep-97
				123	664	7-Oct-97
				664	444C	7-Oct-97

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				444C	664	27-Feb-98
				664	444C	5-Mar-98
P02684	A	LLW	123	551	123	3-Sep-97
				123	664	7-Oct-97
				664	444C	7-Oct-97
				444C	664	27-Feb-98
				664	444C	5-Mar-98
P02794	A	LLW	123	551	123	30-Sep-97
				123	123	2-Jan-98
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
				444C	664	2-Mar-98
				664	444C	5-Mar-98
P02795	A	LLW	123	551	123	30-Sep-97
				123	123	2-Jan-98
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
				444C	664	2-Mar-98
				664	444C	5-Mar-98
P02796	A	LLW	123	551	123	30-Sep-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02799	A	LLW	123	551	123	30-Sep-97
				123	123	2-Jan-98
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
P02802	A	LLW	123	551	123	30-Sep-97
				123	123	2-Jan-98
				123	123	2-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P02804	A	LLW	123	551	123	30-Sep-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02846	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	444C	2-Jun-98
P02847	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	15-Jan-98

Waste Generated in Building 123
Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				664	444C	15-Jan-98
P02848	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	444C	30-Jan-98
P02850	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
P02851	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	444C	2-Jun-98
P02852	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
				444C	664	2-Mar-98
				664	444C	5-Mar-98
P02853	A	LLW	123	551	123	17-Nov-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02854	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	444C	2-Jun-98
P02855	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	444C	2-Jun-98
P02856	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
P02857	A	LLW	123	551	123	17-Nov-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02858	A	LLW	123	551	123	17-Nov-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02859	A	LLM	123	551	123	17-Nov-97
				123	123	2-Jan-98

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				123	123S	9-Jan-98
				123S	664	24-Feb-98
				664	904	4-Mar-98
P02860	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	664	2-Mar-98
				664	444C	5-Mar-98
P02861	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	15-Jan-98
				664	444C	15-Jan-98
				444C	664	2-Mar-98
				664	444C	5-Mar-98
P02862	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	22-Jan-98
				664	444C	27-Jan-98
				444C	444C	2-Jun-98
P02863	A	LLW	123	551	123	17-Nov-97
				123	664C	17-Dec-97
				664C	664	26-Feb-98
				664	444C	5-Mar-98
P02864	A	LLM	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	123S	15-Jan-98
				123S	664	24-Feb-98
				664	904	4-Mar-98
P02865	A	LLW	123	551	123	17-Nov-97
				123	123	2-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03016	A	LLW	123	551	333	12-Jan-98
				333	123	12-Jan-98
				123	444C	30-Jan-98
				444C	664	26-Feb-98
				664	444C	5-Mar-98
P03019	A	LLW	123	551	333	12-Jan-98
				333	123	12-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03020	A	LLW	123	551	333	12-Jan-98
				333	123	12-Jan-98
				123	444C	30-Jan-98
P03042	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98

Waste Generated in Building 123
Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
P03044	A	LLW	123	551	123	20-Jan-98
				551	123	20-Jan-98
				123	444C	24-Feb-98
				123	444C	24-Feb-98
P03045	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03046	A	LLW	123	551	123	20-Jan-98
				123	444C	30-Jan-98
				444C	664	26-Feb-98
				664	444C	5-Mar-98
P03047	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03048	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03049	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03050	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03051	A	LLW	123	551	123	20-Jan-98
				123	444C	24-Feb-98
P03057	A	LLW	123	551	123	22-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03058	A	LLW	123	551	123	22-Jan-98
				123	444C	24-Feb-98
P03059	A	LLW	123	551	123	22-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
				444C	664	27-Feb-98
				664	444C	5-Mar-98
P03060	A	LLW	123	551	123	22-Jan-98
				123	444C	12-Mar-98
P03061	A	LLW	123	551	123	22-Jan-98
				123	444C	12-Mar-98
P03062	A	LLW	123	551	123	22-Jan-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03063	A	LLW	123	551	123	22-Jan-98
				123	444C	30-Jan-98
				444C	664	26-Feb-98
				664	444C	5-Mar-98
P03065	A	LLW	123	551	123	22-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03066	A	LLW	123	551	123	22-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98

Waste Generated in Building 123

Since Sept. 1, 1997

				Container Movement		
Cntnr Nbr	**Status**	**Waste Type**	**Gen Bldg**	**From Bldg**	**To Bldg**	**Tranfer Date**
P03078	A	LLW	123	551	123	28-Jan-98
				123	444C	24-Feb-98
P03079	A	LLW	123	551	123	28-Jan-98
				123	444C	24-Feb-98
P03080	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03081	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03082	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03083	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03084	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03085	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03086	A	LLW	123	551	123	28-Jan-98
				123	664	12-Feb-98
				664	444C	13-Feb-98
P03142	A	LLW	123	551	123	14-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03147	A	LLW	123	551	123	14-Feb-98
				123	444C	24-Feb-98
P03149	A	LLW	123	551	123	14-Feb-98
				123	444C	24-Feb-98
P03150	A	LLW	123	551	123	14-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03151	A	LLW	123	551	123	14-Feb-98
				551	123	14-Feb-98
				123	444C	24-Feb-98
				123	444C	24-Feb-98
P03153	A	LLW	123	551	123	13-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03156	A	LLW	123	551	123	13-Feb-98
				123	444C	24-Mar-98
P03157	A	LLW	123	551	123	13-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98

Waste Generated in Building 123

Since Sept. 1, 1997

				Container Movement		
Cntnr Nbr	Status	Waste Type	Gen Bldg	From Bldg	To Bldg	Tranfer Date
P03158	A	LLW	123	551	123	13-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03159	A	LLW	123	551	123	13-Feb-98
				123	664C	24-Mar-98
P03160	A	LLW	123	551	123	13-Feb-98
				123	444C	30-Mar-98
P03162	A	LLW	123	551	123	19-Feb-98
				123	444C	30-Mar-98
P03165	A	LLW	123	551	123	19-Feb-98
				123	444C	24-Feb-98
P03167	A	LLW	123	551	123	19-Feb-98
				123	444C	24-Feb-98
P03169	A	LLW	123	551	123	19-Feb-98
				123	444C	24-Feb-98
P03170	A	LLW	123	551	123	19-Feb-98
				123	444C	12-Mar-98
P03171	A	LLW	123	551	123	19-Feb-98
				123	444C	24-Feb-98
P03172	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	444C	5-Mar-98
P03173	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	444C	5-Mar-98
P03175	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	444C	5-Mar-98
P03176	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	444C	5-Mar-98
P03177	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	444C	5-Mar-98
P03178	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03179	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03180	A	LLW	123	551	123	23-Feb-98
				123	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03181	A	LLW	123	551	123	23-Feb-98

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				123	123	24-Feb-98
				123	664C	24-Mar-98
P03182	A	LLW	123	551	123	24-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03183	A	LLW	123	551	123	24-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03184	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03185	A	LLW	123	551	123	24-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03186	A	LLW	123	551	123	24-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03187	A	LLW	123	551	123	24-Feb-98
				123	664	2-Mar-98
				664	444C	2-Mar-98
P03188	A	LLW	123	551	123	24-Feb-98
				123	444C	5-Mar-98
P03189	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03190	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03191	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03192	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03193	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03194	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03195	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03196	A	LLW	123	551	123	24-Feb-98
				123	444C	5-Mar-98
P03197	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				664	444C	3-Mar-98
P03198	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03199	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03200	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03201	A	LLW	123	551	123	24-Feb-98
				123	664	3-Mar-98
				664	444C	3-Mar-98
P03203	A	LLW	123	551	123	27-Feb-98
				123	444C	12-Mar-98
P03204	A	LLW	123	551	123	27-Feb-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03205	A	LLW	123	551	123	27-Feb-98
				123	664C	24-Mar-98
P03206	A	LLW	123	551	123	27-Feb-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03208	A	LLW	123	551	123	27-Feb-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03211	A	LLW	123	551	123	27-Feb-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03242	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03243	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03245	A	LLW	123	551	123	4-Mar-98
				123	444C	30-Mar-98
P03247	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03249	A	LLW	123	551	123	4-Mar-98
				123	664C	24-Mar-98
P03250	A	LLW	123	551	123	4-Mar-98
				123	444C	30-Mar-98
P03251	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98

Waste Generated in Building 123
Since Sept. 1, 1997

				Container Movement		
Cntnr Nbr	Status	Waste Type	Gen Bldg	From Bldg	To Bldg	Tranfer Date
P03252	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03255	A	LLW	123	551	123	4-Mar-98
				664	444C	10-Mar-98
				123	664	10-Mar-98
P03258	A	LLW	123	551	123	6-Mar-98
				123	444C	30-Mar-98
P03260	A	LLW	123	551	123	6-Mar-98
				123	444C	24-Mar-98
P03275	A	LLW	123	551	123	6-Mar-98
				123	444C	24-Mar-98
P03297	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03298	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03300	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03301	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03302	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03303	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03304	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03305	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03306	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03307	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03308	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03309	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03310	A	LLW	123	551	123	13-Mar-98
				123	664C	24-Mar-98
P03311	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03312	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03314	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03315	A	LLW	123	551	123	13-Mar-98
				123	444C	30-Mar-98
P03316	A	LLW	123	551	123	13-Mar-98

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				123	664C	24-Mar-98
P03320	A	LLW	123	551	123	23-Mar-98
				123	444C	30-Mar-98
P03321	A	LLW	123	551	123	23-Mar-98
				123	444C	30-Mar-98
P03323	A	LLW	123	551	123	23-Mar-98
				123	444C	30-Mar-98
P03324	A	LLW	123	551	123	23-Mar-98
				123	444C	30-Mar-98
P03326	A	LLW	123	551	123	23-Mar-98
				123	666	15-Apr-98
P03339	A	LLW	123	551	123	25-Mar-98
				123	444C	1-Apr-98
P03340	A	LLW	123	551	123	25-Mar-98
				123	444C	1-Apr-98
P03346	A	LLW	123	551	123	25-Mar-98
				123	444C	1-Apr-98
P03347	A	LLW	123	551	123	25-Mar-98
				123	444C	1-Apr-98
P03349	A	LLW	123	551	123	25-Mar-98
				123	664	20-Apr-98
				664	444C	20-Apr-98
W12487	S	HAZ	123	123S	OFFSITE	15-Dec-97
W12489	S	HAZ	123	123S	OFFSITE	15-Dec-97
W12490	S	HAZ	123	123S	750HAZ	15-Dec-97
				750HAZ	750HAZ	16-Dec-97
				OFFSITE	OFFSITE	26-Mar-98
				750HAZ	OFFSITE	26-Mar-98
W12491	S	HAZ	123	123S	750HAZ	15-Dec-97
				750HAZ	750HAZ	16-Dec-97
				OFFSITE	OFFSITE	26-Mar-98
				750HAZ	OFFSITE	26-Mar-98
W12493	S	HAZ	123	123S	OFFSITE	15-Dec-97
X01814	A	LLM	123	025	123	8-Mar-94
				123	123	10-Oct-97
				123	123S	6-Nov-97
				123S	905	25-Nov-97
				905	904	25-Nov-97
X04825	A	LLM	123	020	554	13-Dec-95
				554	123	11-Feb-98
				123	750HAZ	10-Mar-98
				750HAZ	750HAZ	20-Apr-98
				750HAZ	904	7-May-98
X07093	A	LLW	123	020	123	16-Jul-97
				123	123S	2-Dec-97
				123S	750HAZ	15-Dec-97
X07094	A	LLW	123	020	123	16-Jul-97

Waste Generated in Building 123

Since Sept. 1, 1997

Cntnr Nbr	Status	Waste Type	Gen Bldg	Container Movement From Bldg	To Bldg	Tranfer Date
				123	123S	2-Dec-97
				123S	750HAZ	15-Dec-97
				750HAZ	750HAZ	19-Dec-97
X07098	A	LLM	123	123	123S	2-Dec-97
				123S	750HAZ	15-Dec-97
X07400	A	LLM	123	020	554	4-Nov-97
				554	123S	12-Dec-97
				123S	904	15-Dec-97

total 178 containers

Attachment 16

Toxicity Characterization Leaching Procedure (TCLP)

Sample Analysis

Building 123 TCLP and Total Metals Results

TCLP Sample Numbers	Sample Number	Sample Description and Location	Total Metals Lab Result (ppm)	TCLP Results PPB
011	123-970423-MS-025	Grey and maroon on metal; from south side of HVAC unit on east wing roof, 25' east of west edge, 70 north of south edge, 4' from base.	As 20 Cd 10 Cr 15,000 Pb 90	As 2.6 Cd 0.8 Cr 1,050 Pb 3.2
012	123-970423-MS-026	Silver paint on tar paper; from roof surface, east wing, 23' east of west edge, 67' north of south edge.	As 30 Cd ND Cr 70 Pb 100	As 2.6 Cd 0.4 Cr 3.6 Pb 11.5
	123-970423-MS-027	Tan paint on concrete; from building exterior wall, east wing, west wall, at roof stairs, from window sill, third set from NE corner.	As ND Cd ND Cr 10 Pb 80	
006 007	123-970430-MS-028	Beige on drywall, from room 158, north wall, 11' west of NE corner, 4' from the floor.	As ND Cd ND Cr ND Pb 270	As 2.7 Cd 46.7 Cr 46.8 Pb 20.3
	123-970430-MS-029	White on drywall; from room 157, west wall, 6' north of SW corner, 5' from the floor.	As ND Cd ND Cr 10 Pb 120	
	123-970430-MS-030	Off-white on drywall; from room 161, east urinal devising wall, west side, 2' south of NE corner, 5' from the floor.	As ND Cd ND Cr 20 Pb 10	
004 (not in same room, but similar math.)	123-970430-MS-031	White and maroon on metal; from 161, SE corner, 5' from the floor.	As ND Cd ND Cr 20 Pb 7,300	As 4.7 Cd 0.8 Cr 321 Pb 17.7

TCLP Sample Numbers	Sample Number	Sample Description and Location	Total Metals Lab Result (ppm)	TCLP Results PPB
	123-970430-MS-032	Light yellow on drywall; from room 155, west wall, 1' north of door jamb, 3' from the floor.	As ND Cd ND Cr ND Pb 230	
See (004)	123-970430-MS-033	Light yellow and maroon on metal; from room 155 entry door, east side, 2' north of south edge, 3' from the floor.	As ND Cd ND Cr 1,100 Pb 830	As 4.7 Cd 0.8 Cr 321 Pb 17.7
NA	123-970430-MS-034	Light blue on metal; from room 103, south wall, 6' east of SE corner, 3' from the floor.	As ND Cd ND Cr 10 Pb ND	No TCLP
002	123-970430-MS-035	Blue, tan and green on wood; from NE entry, inner door, north side, 1' east of west jamb, 1' from the floor.	As ND Cd ND Cr 310 Pb 2,300	As 2.6 Cd 3.2 Cr 30.4 Pb 199
001	123-970430-MS-036	Yellow and green on metal; from 113 utility, north jamb, 1' from the floor.	As ND Cd ND Cr 360 Pb 2,700	As 4.8 Cd 0.8 Cr 27.3 Pb 7.7
NA	123-970430-MS-037	Light green and white on concrete; from room 115, north wall, 1' west of east door jamb, 2' from the floor.	As ND Cd ND Cr 260 Pb 3,700	No TCLP
010	123-970430-MS-038	Light brown and green on wood; from room 115 entry door, south side, at west edge, 2' from the floor.	As ND Cd ND Cr 820 Pb 4,000	As 2.6 Cd 3.9 Cr 24.3 Pb 103

TCLP Sample Numbers	Sample Number	Sample Description and Location	Total Metals Lab Result (ppm)	TCLP Results PPB
(See 004)	123-970430-MS-039	Brown and white on metal;from room 131C entry door, south side, 1' from edge, 1' from the floor.	As ND Cd ND Cr 10 Pb 200	As 4.7 Cd 0.8 Cr 321 Pb 17.7
NA	123-970430-MS-040	Grey, dark green and black on concrete; from 113B, west wall, 3' south of NW corner, 6 in. from the floor.	As ND Cd ND Cr 2,600 Pb 90	No TCLP
NA	123-970430-MS-041	Light grey and light green on concrete; from room 131C, west wall, 3' south of NW corner, 2' from the floor.	As ND Cd ND Cr 120 Pb 2,300	NO TCLP
NA	123-970430-MS-042	Very light grey and light green on metal between wall panels; from room 125, east wall, 4' south of the north entry, 2' from the floor.	As ND Cd 10 Cr 30 Pb 750	NO TCLP
NA	123-970430-MS-043	Light pink and light blue on drywall; from room 140A, east wall, 4' north of SE corner, 4' from the floor.	As ND Cd ND Cr ND Pb 10	NO TCLP
NA	123-970430-MS-044	Light brown and white on drywall; from room 150, south wall, 1' east of SE corner, 4' from the floor.	As ND Cd ND Cr 10 Pb 180	NO TCLP
NA	123-970430-MS-045	Very light brown and white on drywall; from room 165, south wall, 11' west of SE corner, 2' from the floor.	As ND Cd ND Cr ND Pb 10	NO TCLP

Note: BDL means Below Detection Limit.

Attachment 17

Lessons Learned

for the Building 123

Decommissioning Project

Attachment 17
RF/RMRS-98-253.UN

KAISER ◆ HILL
COMPANY

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

Lessons Learned

For The

Building 123 Decommissioning Project

Kaiser-Hill, L.L.C.
and
Rocky Mountain Remediation Services, L.L.C.

REVISION 1

AUGUST 1998

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS ii

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION AND PROJECT SCOPE 2

3.0 LESSONS LEARNED - AREAS OF SUCCESS 3

4.0 LESSONS LEARNED - AREAS OF IMPROVEMENT 5

4.1 SAFETY - LESSONS LEARNED 9

4.2 PLANNING - LESSONS LEARNED 9

4.3 CHARACTERIZATION - LESSONS LEARNED 9

4.4 FACILITY TRANSITION - LESSONS LEARNED 9

4.5 PROJECT EXECUTION - LESSONS LEARNED 9

5.0 REFERENCES 10

APPENDICES

Appendix A—Observations and Enhancements A-1
Appendix B—Action Plan B-1
Appendix C— Radiological Operations and Radiological Engineering Summary of Problems and Symptoms, and Corrective Action Plan C-1

ATTACHMENTS

Attachment 1— Independent Assessment of the Perchloric Flushing Procedure

ACRONYMS

ACM	Asbestos-containing material
AR	Administrative Records
ASD	Analytical Services Division
ASP	Activity Screening Process
CDPH&E	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	Construction Field Change
D&D	Decontamination & Decommissioning
DOE	U.S. Department of Energy
DQOs	Data Quality Objectives
ECR	Engineering Change Requests
ER/QA	Environmental Restoration/Quality Assurance
ERE	Environmental Readiness Evaluation
FRSP	Final Radiological Survey Plan
HASP	Health and Safety Plan
HEPA	High-efficiency particulate air
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Program
K-H	Kaiser-Hill, L.L.C.
LO/TO	Lockout/Tagout
MARSSIM	Multi-Agency Radiation Site Survey and Investigation Manual
MCL	Maximum Contaminant Level
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
PAM	Proposed Action Memorandum
Pb	Lead
PCBs	Polychlorinated biphenyls
PEP	Project Execution Plan
PM	Project Manager
POC	Point-of-Contact
POD	Plan of the Day
ppb	parts per billion
PU&D	Property Utilization Disposal
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RE	Radiological Engineering
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RIR	Radiological Incident Report
RLCR	Reconnaissance Level Characterization Report
RMRS	Rocky Mountain Remediation Services, L.L.C.
RO	Radiological Operations
SAPs	Sampling Analysis Plans
SDRM	Site Documents Requirements Manual
SME	Subject Matter Expert
SSOC	Safe Sites of Colorado
TBD	Technical basis documents
WBS	Work Breakdown Structure
WEMS	Waste and Environmental Management System
WMP	Waste Management Plan

LESSONS LEARNED FOR THE

BUILDING 123 DECOMMISSIONING PROJECT

1.0 EXECUTIVE SUMMARY

Building 123 was razed without serious personnel injuries or environmental impact, but the project experienced several unknown site conditions, which impacted the budget and schedule. This document presents some important lessons learned which can assist Project Managers for future demolition projects. An executive summary of key lessons is provided below.

1. The safety performance on the project was well managed at the start of the work with a slight loss in paying attention to details near the completion of field activities. Safety was the number one priority strongly supported by the project team and the field workers.

   Near the completion of the project, there was not enough attention paid to clean up field work. This resulted in a near-miss safety incident that could have lead to an injury.

   The point of emphasis is to keep safety awareness the highest priority from the start of any project to the successful completion of all field activities.

2. The Planning Phase of the Building 123 Decommissioning Project was incomplete and/or non-existent.

   - The integrated, resource loaded, schedule was not given sufficient input and review from the performing organizations and not tracked sufficiently during the execution phase.
   - The Risk Analysis and Contingency Analysis did not address all potential areas of change. Several key assumptions were not included in the Project Execution Plan (PEP).
   - Changing Project Team members during the life cycle of the project was disruptive and affected continuity and efficiency.
   - Project Planning documents were not as complete as they should have been due to limited preparation time and limited access to the facility.

3. Characterization of Building 123 was not allocated sufficient time and budget, which resulted in an incomplete reconnaissance survey and report of the building hazards and contamination.

   - Access to the facility was limited which restricted the accuracy and completeness of the surveys.
   - The building was occupied during reconnaissance characterization work.
   - Limited intrusive sampling was allowed for (lead (Pb), asbestos, Polychlorinated Biphenyls (PCBs), etc.) since the building was occupied.
   - The characterization report was not updated to include new information on hazards and contamination, as the information became available.

4. There was not a formal facility transition/turnover performed.

   - There was not a transition plan developed to turn over the facility.

- There was not a walkdown/inspection conducted between the exiting tenants and the new facility manager with a Memorandum of Understanding written and signed by the two parties.
- The decommissioning Project Team accepted the facility without full knowledge of the condition of the building.
- The building utility systems that were reported as working were in fact not working. Several maintenance tasks were necessary to complete deactivation.
- The facility was not secured to prevent unexpected "drop off" of excess materials and chemicals.

5. Execution of the field work was complicated for the following reasons:

   - There were three separate subcontracts awarded to support the schedule, making the management and integration of the two subcontractors complicated and confusing.
   - There were numerous unexpected schedule impacts such as:
     - Abandoned duct with perchloric acid,
     - Asbestos insulation found in concrete block wall,
     - Increased volume of low level asbestos due to additional contamination found,
     - Unknown substances in the scrubbers, process ducts and process waste lines,
     - Additional radiological contamination in Room 111 which required scabbling an additional 140 square feet; and a "room within a room" (in Room 135) which was constructed of asbestos-containing material (ACM).

6. Numerous changing radiological requirements caused the project to experience schedule delays and rework.

   - Field supervision was not consistent as the Foreman was changed daily during the initial startup.
   - There was confusion between what U.S. Department of Energy (DOE), Radiological Engineering (RE) wanted and needed and what the Project Team Radiological Operations (RO) was performing and delivering.
   - Data was not being collected consistently nor managed and tracked effectively.

7. Final radiological surveys had to be much more detailed than planned. The final report changed from Class III (10%, no grids) Radiation Survey requirements to Class I (100%, one meter grids) due to additional contamination found.

   - Unexpected isotopes found required the work to be suspended until the contamination was characterized.

2.0 INTRODUCTION AND PROJECT SCOPE

The purpose of this report is to summarize Lessons Learned from the Building 123 Decommissioning Project.

Building 123 was constructed in 1953 and was used as an analytical laboratory, dosimetry and instrument calibration facility. The building also was used for medical research, storage for all radiological health records, office space for radiation health specialists, and a laboratory for calibration of criticality alarms.

The decommissioning of Building 123 was done according to the *Proposed Action Memorandum for the Decommissioning of Building 123* (PAM), Revision 6, dated March 26, 1998. The PAM provides a detailed description of the decommissioning tasks for Buildings 113, 114, 123, and 123S. These tasks included decontamination of radiologically contaminated facility systems, partial closure of Resource Conservation and Recovery Act (RCRA) Unit 40, and characterization of Individual Hazardous Substance Sites (IHSS) 121 and 148.

Decommissioning of Buildings 113, 114, 123, and 123S was conducted in several phases. A description of each major task is provided below:

- Relocation of building tenants, and removal of furniture, equipment, and excess chemicals.
- Characterization for hazards and potential contamination. *The Reconnaissance Level Characterization Report for Building 123* (RLCR) (October 1997) identifies the type, quantity, condition, and location of both confirmed and potential sources of radioactive and hazardous substances which were present in Building 123.
- Strip-out of equipment and building materials, which were contaminated with radioactivity, hazardous wastes, and hazardous materials. This included asbestos abatement, closure of the components of RCRA Unit 40 in Building 123, and disconnection of utilities.
- Completion of final radiological surveys and approval by DOE.
- Demolition of Buildings 113, 114, 123, and 123S.
- Characterization of IHSS 121 and 148 in accordance with the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123.*

A project-specific *Health and Safety Plan* (HASP) was prepared outlining the overall safety strategy for the decommissioning effort. Attention to safety was given highest priority and the project was completed with an excellent safety record.

All waste generated during decommissioning of Buildings 113, 114, 123, and 123S was handled in accordance with the project *Waste Management Plan* (WMP) and applicable site procedures. A full-time Environmental Coordinator/Waste Management Specialist supervised all waste characterization, packaging, shipment, and documentation. All low-level, hazardous, and mixed waste was packaged and staged appropriately, and was tracked in the Waste and Environmental Management System (WEMS).

An Environmental Readiness Evaluation (ERE) was conducted by Kaiser-Hill, L.L.C. (K-H) and DOE. The ERE team phased the assessment to match the three key phases of the project:

- Building strip-out
- Asbestos abatement
- Demolition

3.0 LESSONS LEARNED - AREAS OF SUCCESS

The Project Team(s):

Observation:

Did an effective job in managing the site's activities and overseeing safety. Project personnel exhibited a positive awareness towards safety.

Enhancement:

Maintain a high awareness of safety and reinforce safe work practices up to and including the conclusion of subcontractor demobilization.

Observation:

Developed and maintained an open line of communication with the state regulatory agencies. Copies of approval documents were faxed directly to the K-H Project Manager's (PM) office from the state personnel.

Enhancement:

Keep customers and stakeholders informed (e.g., DOE and Colorado Department of Public Health and Environment [CDPH&E]) of project plans. Maintain a Correspondence / Document Transmittal Log throughout the project, listing all items delivered and received directly from regulatory agencies.

Observation:

Ensured that RE representation was included in the Project Team meetings during the planning and scheduling of the project.

Enhancement:

Maintain a RE and RO presence on the jobsite throughout planning and during field activities.

Observation:

The Project RE group chose to use the Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM) as the basis for the final radiation survey plan. At the time of the decision, this was a draft document. MARSSIM is now final and will soon be the guidance document used onsite.

Enhancement:

Continue training plant personnel on MARSSIM and the requirements of this document.

Observation:

Contracted an independent Subcontractor to review the Perchloric Acid Hoods and Duct Removal Procedure (see Attachment 2). The input received from the expert was used to modify the procedure to enhance safety. Additional tasks were incorporated to improve safety during the work.

Enhancement:

Use third party Subject Matter Experts (SMEs), to independently review work tasks that are not considered routine.

Observation:

Performed several inspections of the facility early in the planning phase with support organizations such as Plant Power, Utilities, and Property Utilization and Disposal (PU&D).

Enhancement:

Continue to perform inspections of a facility during the planning and characterization and during the execution phase of a project.

Observation:

Setup a detailed charging matrix using suffixes to capture and categorize costs for future use when reviewing total costs for specific tasks.

Enhancement:

Set aside separate charge numbers for separate tasks or phases of the project to keep costs distinct, not just to suffixes.

Observation:

Used an Accountability Board, and Sign-In Log to control the project site. This helped ensure the safety of those working in and around the buildings. A training matrix was also used in conjunction with the Sign-In Log to ensure that people entering the site were either trained or properly escorted.

Enhancement:

Ask for input from Security to control access to the site.

Observation:

Ensured that a Plan of the Day (POD) was used to plan, schedule, and prepare for future work. This POD assisted in having the lockout/tagout (LO/TO) work performed without delay, and having resources in place when needed preventing additional delays.

Enhancement:

Keep the POD short and concise. Team members need to update the status **only**, and not go into specific detail unless warranted. The POD needs to take no more than 20 minutes.

Observation:

Responded expeditiously in support of changes to contract documents. There were very few delays as a result of needed changes to procedures, Construction Field Change (CFC) Notices, and Engineering Change Requests (ECRs).

Enhancement:

Distribute the Document Tracking Logs (e.g., ECR Logs, CFC Logs) to the Project Team members for their use and information.

Observation:

Assigned one person to manage the requests of the ERE Team. This helped to expedite and to organize the review. The Project Team was very flexible in supplying additional documents when asked.

Enhancement:

Concentrate on the priority of ERE requirements and deliver documents that need review as soon as possible. Include an ERE team member in reviewing documents as they are being prepared.

Observation:

Utilized a State Certified Health Specialist to perform daily visual inspections of asbestos abatement and to manage the clearance air monitoring. This action helped the Asbestos Abatement Contractor and the Strip-Out Contractor to work without delays and to ensure compliance with State and Federal Asbestos Abatement Regulations.

Enhancement:

Housekeeping and inspections can always be improved. The use of a Friday clean-up day, for example, keeps the site safe and enhances performance.

Observation:

Ensured that there was never a decision to proceed with a work task if there were any unanswered questions concerning an activity. Several times work was stopped where there was a safety question, and work was not restarted until all parties were in agreement with the resolution of the issue; even if it impacted the schedule.

Enhancement:

Always utilize craft, and/or other direct workers to participate in the work planning, safety planning, and development of corrective actions.

Observation:

Workers were invited and participated in manager meetings to discuss upcoming work tasks. In two cases, Union representatives suggested actions that eliminated work tasks, reduced exposure to work hazards, and saved the project time and budget.

Enhancement:

Again, craft personnel are paramount in planning work tasks.

Observation:

The first topic of each POD meeting was safety. The team discussed the tasks to be worked for the day, and reviewed the tasks planned for the next two to three days. A lessons learned topic from another facility that pertained to the project was presented and discussed.

Enhancement:

Safety is the site's number one priority. Practice safe work ethics, and do not compromise.

Observation:

The Project Team worked closely with the Shift Superintendent in making plant announcements concerning vehicle and pedestrian traffic. There were no instances of problems due to closing down sidewalks and roads.

Enhancement:

Keep support departments and supporting organizations informed of the project status. Ask for support as early as possible to minimize project impacts.

Observation:

Reacted assertively in managing unknown site conditions, and controlling work situations that could have impacted worker safety.

Enhancement:

Do not assume that all bases are covered. Assume that there will continually be unanswered questions needing to be dispositioned.

4.0 LESSONS LEARNED - AREAS OF IMPROVEMENT

4.1 SAFETY - LESSONS LEARNED

Safety should be the number one priority for every project performed at Rocky Flats Environmental Technology Site (RFETS). Just saying the words "be safe" is not enough. Project team members and workers can sense that safety is paramount by the actions taken by the project managing personnel.

Safety is never to be compromised during a project regardless of pressures such as meeting a tight schedule, costs control, and the completing of field work leading to subcontractor demobilization.

4.2 PLANNING - LESSONS LEARNED

Initial planning can make or break a project schedule and budget.

Invest the time and budget needed in order to deliver a complete and concise project plan. The investment will pay greater dividends as the project passes through the life cycle to close-out.

Perform a risk assessment / needs analysis prior to completing the project planning document.

4.3 CHARACTERIZATION - LESSONS LEARNED

Project Characterization must be clearly defined, investigated, concise, and complete before the final project budget and schedule are established.

If a project is unable to complete the needed surveys for characterization because of limited access, or due to other mitigating circumstances, clearly state the limitations and assumptions in the project planning documents.

4.4 FACILITY TRANSITION - LESSONS LEARNED

During the facility transition and dispositioning of equipment, project expectations must be clearly established and formally agreed to.

The RFETS policy for the transitioning and dispositioning of a facility and all associated capital equipment needs to be included in the plans for the decommissioning activities.

4.5 PROJECT EXECUTION - LESSONS LEARNED

Roles, responsibilities, levels of authority, chain of command, and signatory status must be clearly defined and enforced throughout the execution phase of a project.

Accountability, reporting, and overall management of a project is to reside with a single individual, the PM.

5.0 REFERENCES

Asbestos Characterization Report, Addendum to Building 123 Inspection, Revision 1, June 6, 1997.

Building 123 Decommissioning Project Execution Plan (PEP), Revision 4, September 11, 1997.

Building 123 Decommissioning Project Health and Safety Plan, Revision 1, February 1998.

Certification of Partial Closure, RCRA Unit 40, Building 123 , May 1998.

Close-Out Radiological Survey Plan for the 123 Cluster, Revision 3, January 1998.

Closure Plan for Building 123 Components of RCRA Unit 40 (Closure Plan), Revision 0, November 12, 1997.

Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab, Revision 0, December 1997.

Lead Characterization Report, Revision 0, May 1997

Proposed Action Memorandum for the Decommissioning of Building 123 (PAM), Revision 6, March 26, 1998.

Reconnaissance Level Characterization Plan for Building 123, Revision 0, September 1997.

Reconnaissance Level Characterization Report, Revision 0, October 1997.

Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123, Revision 1, May 1998.

Waste Management Plan for Building 123, Revision 1, March 1998.

Appendix A

Observations and Enhancements

TABLE OF CONTENTS

A.1 General A-3
A.2 Project Execution Plan (PEP) A-9
A.3 Project Controls A-10
A.4 Environmental Readiness Evaluation (ERE) A-11
A.5 Engineering/Integrated Work Control Program (IWCP) A-11
A.6 Subcontracts A-12
A.7 Project Documents A-13
A.8 Radiological Characterization A-15
A.9 RCRA Closure - Lessons Learned A-19
A.10 Asbestos Abatement A-20
A.11 Work Parameters A-21

A.1 General

Observation:

The Project Team was pushed to work extended hours in an attempt to meet scheduled milestones and deadlines. This caused problems such as poor decision-making, missed assignments, and could have ultimately lead to a safety incident.

Enhancement:

The safety record for the project was very good. It should not be a recommended practice to work extended hours for long periods of time.

Observation:

Near the completion of the project, there appeared to be instances where safety awareness was not at the same level. This caused a questionable situation regarding safety being the number one priority for the project.

Enhancement:

Do not minimize any issue or incident during project execution, especially during the final stages, including demobilization. Review tasks scheduled to work at the POD and identify all potential hazards. Place particular emphasis on safety at the end of the project when people have a tendency to rush to complete the work.

Observation:

Project personnel were observed without the proper personal protective equipment. They entered the fenced-in work area and had to be directed out of the construction zone. There could have been an accident due to inadequate controls of the site. This was preventable.

Enhancement:

Signage can always be improved that clearly designates restricted areas. Warning signs can be placed along the path around and leading to a site that notifies the general population of what routes are closed and locations of detours.

Observation:

Risk analysis for the project was not sufficiently detailed. For example, various project documents included general contingency plans; however these were not enough to promptly manage unknown encountered in the field. As a result, the project experienced schedule delays and cost growth.

Enhancement:

Invest the time and money during the planning and characterization phase of a project to perform a risk analysis that the Project Team accepts as being complete and adequate so that action plans can be written.

Observation:

The project did not perform an adequate risk analysis/contingency analysis to allocate resources for unknown and changed site conditions. The project did not adequately plan for surprises (exterior and interior building contamination; lead paint; hidden heating, ventilation, and air conditioning; ducting contaminated with perchloric acid; unknown hazardous wastes; and the complexity of the perchloric hood disassembly).

Enhancement:

Develop a contingency plan and budget, which can help manage unknowns until detailed characterization is complete. Have the schedule and budget reflect the risks associated with the unknowns. Update the plan through the life of the project.

The plan should outline a remedial action for various situations, which may be encountered. This allows the worker to remediate the problem without having to shut down work.

Observation:

The Project Team had a high rate of turnover and the team did not include adequate representation of critical departments in the early planning phases. The Project Manager (PM) position was held by several different people. Each change shifted the culture of the project enough to cause repetition and/or rework of some tasks. Personnel were reassigned to other projects because there were not adequate, qualified staff to support this project and other concurrent projects.

Enhancements:

The core members of the team need to remain with the project through completion. The efficiency of the project will be enhanced if team members are knowledgeable of the history, the original scope, and are involved in decisions from beginning to completion. Implement a strong matrix of project support personnel to ensure consistency.

Representatives from all support groups need to be included in the early planning phases. Keep track of meeting attendance and note what areas are not being supported. Document what areas need additional support, coverage, then formally request support from the specific department. Project personnel need to be briefed on the policies, procedures and work parameters required to provide a finished product, in writing, prior to estimating scope of work.

Include participation from the facility operations personnel into the planning and scheduling. Include the landlords/tenants in developing the schedule for relocation and facility transfer before they leave the area or are reassigned.

Include an RO Foreman on the Project Team. The foreman's duties need to include the identifying and assigning of responsibility for tracking the type, number and condition of instruments, the training of individuals assigned to the project working radiological issues, and the productivity/schedule of the work to be completed. Dedicated Radiological Control Technicians (RCTs) needs to be assigned to the project throughout the execution stage.

The Project Team needs to participate in the development and review of all significant project documents so that all documents are consistent, and that everyone understands the scope of each document. This will help to ensure documents are consistent with the project plan.

Prepare and maintain a list of project personnel. Include their phone number/pager/radio numbers, and responsibility. Keep this up-to-date throughout the life cycle of the project. Use staff augmentation from off-site, if temporary support or services are required. Identify and define roles and responsibilities for each team member and maintain an action items list from the weekly project meetings.

Observation:

The RLCR was not completed in sufficient detail. There was an unrealistic schedule placed on completing the report. This was compounded by the fact that the facility was still in operation at the time of the survey, limiting access to many areas, and making it difficult to collect destructive samples. This caused the project to encounter numerous unknown site conditions, which impacted the schedule and budget.

Enhancement:

Schedule adequate time to ensure proper characterization. This will reduce the number of unexpected surprises that are inherent to building decommissioning. The more complete the characterization, the more accurately the schedule and budget can be prepared. Finish the characterization report after facility transfer to Decontamination & Decommissioning (D&D) is complete. Allow the sampling team to take intrusive samples of the entire facility, if required.

Observation:

The project did not have a detailed, guidance plan for the characterization activities. This caused the Project Team to write and manage several similar documents, increasing the time and money needed to complete these tasks. There was also confusion and disagreement on how to implement various quality requirements for sampling and analysis.

Enhancement:

Issue one subcontract for the entire scope of the project. Develop a Fixed Price, Turn-Key Statement of Work. Dividing a project into phases needs to be carefully considered. Phases may not be distinct enough to avoid complicated sequencing problems (and additional costs) which can occur with multiple subcontractors.

Observation:

The asbestos abatement subcontract for Building 123 was combined with an abatement project in another facility. This created unnecessary complications in preparation of deliverables, requests for payment, fulfilling training requirements, and adapting to schedule changes since the two facilities had completely different bid documents, scopes, radiological conditions and project constraints. This situation caused the project to experience schedule delays because the Subcontractor did not have the trained resources to support both projects.

Enhancement:

Project subcontractors need to be separate from any other subcontracts or projects to avoid conflict and competition for resources. Each contract needs to be enforced individually and the responsibility to support a project is the Subcontractor's.

Observation:

The project did not have a detailed, guidance plan for the characterization activities.

Enhancements:

Identify what sampling operations are subject to sampling analysis requirements, which ones need only identify Data Quality Objectives (DQOs) and which ones follow prescribed processes (e.g., asbestos and radiological characterization). Generate Rocky Flats Cleanup Agreement (RFCA) Standard Operation Protocols or at least detailed guidance covering standard characterization operations regarding D&D operations (asbestos characterization, Beryllium, PCBs, lead paint, lead paint characterization, etc.) to ensure defensible sample results. Include contingency tasks in the plan if unknowns are encountered. A standard format for building characterization, retention and management of records, DQOs, etc. is needed.

ER/Quality Assurance (QA) personnel need to develop guidance documents on DQOs for characterization on projects and on a standard format for Sampling and Analysis Plans (SAPs).

Observation:

The project did not coordinate with the Analytical Services Division (ASD) regarding the type, quantity, sample analysis, and analysis turn-around time of samples collected for the project. ASD was not prepared to analyze the types of samples being collected for characterization. For example, on-site labs would not accept concrete core samples of the building slab because they had no way to prepare the samples (grind them) for analysis. This caused significant schedule delays in the field, waiting for lab results.

Enhancement:

Involve the ASD in developing the sampling documents so that the labs are prepared to handle the sample media and analytical requirements of the project. All necessary sampling techniques and required turn-around times must be clearly identified in the sampling plan and integrated into the project schedule.

Observation:

The characterization reports did not include all assumptions and did not identify areas, which were not accessible at the time of the inspection. This caused the project to spend unplanned resources to experience schedule delays, and contributed to the unforeseen site condition problem.

Enhancement:

Ensure characterization reports, and all other project reports, clearly state all assumptions and limitations regarding sampling activities.

Observation:

The Project Team was not allowed to collect destructive samples during the RLCR survey due to operation of the laboratories in the facility. This caused the RLCR to be incomplete and not reflect accurately what hazards there were within the facility. The incomplete RLCR caused the project to experience numerous schedule delays and cost impacts.

Enhancement:

Plan for and schedule destructive sampling techniques in the facility during the characterization phase of the project. If unable to do so, clearly state the limitations and assumptions in the project planning document.

Observation:

Paint samples were not originally analyzed for PCBs because historical information presented suggested there were none. However, after the paint sampling and analysis was complete, other DOE facilities reported that PCBs had been encountered in the paint. Since the presence of PCBs could greatly impact waste disposal, it was decided that this analysis must be completed. Recovering the samples for subsequent PCB analysis cost additional time and expense.

Enhancement:

Paint samples need to be analyzed for PCBs as well as lead and heavy metals during the initial characterization phase. Do not assume no hazards exist. Spend the money up front to ensure that the information used to plan a project is as accurate and complete as possible. Plan and schedule for the analytical data needed to decommission a facility.

Observations:

There were several people directing work in the field, which led to confusion, and conflicting direction in some instances. Some team members had numerous people directing their work. For example, the Asbestos Abatement Subcontractor had to answer to both the Strip-Out/Demolition Subcontractor and to the Owner's Representative.

There was also some inconsistency in personnel who were responsible for maintaining the Integrated Work Control Program (IWCP) package, and as a result, it was not always updated as required.

Enhancements:

Designate one person an Owner's Representative such as the Construction Manager to direct work and approve changes in the field. This person must coordinate the proper reviews of changes and modifications.

Individuals need to be identified that are authorized to make changes to the IWCP package. Only those individuals are authorized to make the corrections needed.

Observation:

Housekeeping could have been improved. Housekeeping is extremely important when a facility has contaminants such as asbestos or lead. The result of poor housekeeping can become a safety problem and/or lead to other work issues.

Enhancement:

Clearly define in all subcontracts who is responsible for site housekeeping with standards and frequencies.

Observation:

Project personnel were not consistently trained to meet requirements of supporting work for the project. This resulted in delays to fieldwork and unplanned costs. Personnel, who were trained, worked extended hours to support field activities leading to undue stress and fatigue.

Enhancements:

Determine the required training for project personnel during the planning phase. Develop a training matrix for all project personnel (Owner's Representatives, Subcontractors, and visitors) depending upon their duties.
Thoroughly review training requirements in the bid documents for the Subcontractor prior to issuance of the subcontract.

Clearly state that it is the Subcontractor's responsibility to support the project with trained personnel.

Make the Subcontractor responsible for the cost of training all of their own personnel, and for training as many people as necessary to complete the task. Make sure it is clearly stated in the Bid Document that the Subcontractor is responsible for the cost of training any new employees and for retraining employees that do not pass training courses.

Observation:

The project experienced delays waiting for a LO/TO Administrator and Verifier.

Enhancement:

The Facility Representative needs to provide a LO/TO Administrator and Verifier. During active strip-out activities, a full time LO/TO Administrator and Verifier must be available until the utilities are disconnected.

Observation:

The deactivation of the fire sprinkler system was delayed as a strip-out activity, which required extended freeze protection measures.

Enhancements:

The fire sprinkler system should be deactivated as soon as possible to decrease costs for maintenance and freeze protection.

Several lessons learned have been prepared for freeze protection by other projects. These are summarized below:

- Physical and operational changes to facilities and systems resulting from deactivation activities and process changes can cause increased vulnerability to freezes. When deactivation and other configuration changes occur, building specific freeze protection programs, room areas, and systems must be reviewed to ensure that appropriate measures are taken to prevent freezing of equipment and systems due to the changed configuration.

- Out-of-service/out-of-commission liquid containing systems must be thoroughly drained to prevent freezing.

Personnel directly involved in or overseeing D&D and closure activities such as engineers, engineering managers, D&D supervisors, construction managers, and building operations personnel, need to be informed and aware of the role they plan in freeze protection.

A.2 Project Execution Plan (PEP)

Observations:

The project did not have an adequate characterization of the building prior to preparing the PEP and other project-specific documents. This caused the project to experience numerous scope changes, schedule delays, and work stoppages.

The PEP (budget, schedule, and assumptions) and several other project-specific documents were developed prior to characterization being completed and it was assumed that there was little contamination in the building. As a result, the PEP did not establish realistic schedules and budgets for the project. The PEP was also developed prior to finalization of the final *Radiological Survey Plan* and therefore, did not include all of the budget and schedule needed to complete this effort.

Enhancements:

The PEP should be a dynamic, living document, which is revised to reflect developing project knowledge. At a minimum, develop one PEP for the preliminary characterization stages of the project; and a second, more detailed, PEP based on the results of the characterization for the execution of work.

Complete the building transition from tenant use to decommissioning status. After the building is empty, then the reconnaissance survey/characterization work can be completed. After the facility characterization is completed, then plan, estimate and schedule the project. This allows the Project Team to have accurate data available to complete project planning.

Observation:

The PEP did not adequately list assumptions which supported the schedule and budget. As a result, the schedule and budget did not reflect the unknowns and risks associated with the project causing schedule delays and cost control problems.

Enhancement:

Ensure the PEP and all other project documents clearly state all assumptions identified in a risk and needs analysis. Do not assume that the information is known. If it is not written down, it does not exist.

Observation:

The Davis-Bacon determination was completed too early in the planning stage of the project and prior to any building characterization. It was assumed that the building had little to no radiological contamination, and many other contaminants had not been identified at that time. This caused the Project Team to divide the work and led to two separate contracts for decontamination work.

Enhancement:

The Davis-Bacon determination needs to be made after facility characterization, is complete so that work forces used (either "Davis-Bacon covered" or "non-covered") are qualified to handle the scope of work.

A.3 Project Controls

Observation:

Costs for work activities and support groups were not tracked in a manner that accurately captured where costs were incurred. The plan to use various suffixes with one charge number to separate and track costs could not be used effectively when a new site accounting system was implemented midway through the project. Identifying incurred costs for specific tasks has been difficult and inaccurate.

Enhancement:

Organize the Work Breakdown Structure (WBS) to have separate charge numbers (not just a suffix) for cost collection and tracking of specific tasks. Include this information in the PEP.

Observation:

The project schedule was not maintained at the level needed through project completion. As a result, reporting and tracking performance status was inefficient.

Enhancement:

Develop and maintain a detailed, integrated, resource located project schedule, identifying the critical path. The schedule should be updated weekly, at a minimum, and summarized to the WBS level (for integration with accounting).

Observation:

The site does not have an adequate method to track D&D costs. The Project Team developed their own system that was not consistent with other projects. Historical baseline information would help in the development of better cost and schedule estimates.

Enhancements:

Track and categorize cost data to be utilized in estimating future D&D costs. Significant data to capture are listed below:

- Actual work that took place versus the original scope of work contracted.
- Actual costs incurred by the subcontractor to perform the work (such as: removal of hoods, RCRA closure flushing, removal of process waste lines, etc.).
- Time and resources necessary to prepare each project document.
- Sampling and analytical costs.

Observation:

Procurement activities (payments, change orders, charge card expenses) were not coordinated with the Project Controls personnel, which resulted in unexpected vendor charges being incurred each month.

Enhancements:

All procurement activities need to be coordinated with the Project Controls personnel. Individual subcontracts need to be tracked monthly and coordinated with Project Controls (to include contract value, payments/accruals, and modifications pending). A schedule of values should be developed by the Subcontractor and reviewed and approved monthly by the PM, Subcontractor, and the Project Team Controller. PMs should be updated weekly on project status. Review Requests for Payment each month.

Project costs should be controlled by one single Point-of-Contact (POC), the PM, who is also the Contract Technical Representative.

A.4 Environmental Readiness Evaluation (ERE)

Observations:

After the project planning was complete, it was directed by DOE, that the project would be subject to a pilot audit program called an Environmental Readiness Review.

Since the ERE was a pilot program, it was not a planned process. In addition, implementation of the ERE was not taken into account in the initial project plan and schedule. There was no procedure or document which outlined the ERE process, and as a result, there was little consistency in the evaluations during different phases of the project. Review techniques used by various ERE personnel were inconsistent which caused schedule delays. The Project Team delayed the ERE team in their review by not having completed documents.

Enhancements:

The K-H/DOE ERE process must be proceduralized. An outline checklist of the ERE review requirements should be developed so that the Project Team can plan, schedule and budget appropriately.

Include the ERE representative during the planning phase of the project and have that individual assist the project team in completing the review information prior to delivery to the ERE team.

Projects that will be subject to an ERE must be notified prior to preparation of the PEP, to ensure schedules and budgets have time for reviews, approvals, and hold points.

A.5 Engineering/Integrated Work Control Program (IWCP)

Observation:

The responsibilities of project personnel and Subcontractors were not definitized. As a result, there was some confusion about who was responsible for completing certain tasks such as maintaining the IWCP, directing work at the site, and authorizing various day-to-day changes which caused schedule delays in the field.

Enhancement:

Responsibilities of project personnel and subcontract personnel must be clearly defined in the Division 1 Specifications of the bid documents.

Observation:

The project encountered several unforeseen site conditions. This was primarily due to a limited characterization report, poor as-built documentation for the facility, and limited access to the facility before writing the Bid Documents because the facility tenants were still occupying the building. This caused the project to experience several change orders and work delays.

Enhancement:

Plan, schedule, and invest the time needed in detailed engineering walkdowns as soon as the facility is unoccupied, and during the planning/engineering phase so it is not necessary to rely on the as-built drawings for above ground structures and systems. Update the project documentation as new information is made available, and continue to perform investigative walkdowns as new areas are made accessible.

Observation:

Several engineering change orders were prepared to provide temporary electrical power for construction trailers, which delayed mobilization of the Subcontractor.

Enhancement:

Either design and schedule temporary electrical power and telephone for the Subcontractor to be installed before the Subcontractor mobilizes or make the Subcontractor completely responsible for all their own temporary power and communications using generators and cell phones. Identify the number of trailers that will be allowed on the project site and designate the location of placement in the Division 1 Specifications of the Bid Documents.

A.6 Subcontracts

Observation:

The project did not make provisions for lost time due to weather and other delays, at no fault of the Subcontractor. As a result, the owner paid for these delays. The budget did not have a contingency fund to pay for this cost.

Enhancement:

Specify a set number of lost time hours caused by the owner, and add this to the performance period in the subcontract. Schedule for weather delays. Specify that time lost and costs due to weather are not the responsibility of the Owner, but are the responsibility of the Subcontractor.

Observation:

The Asbestos Abatement Subcontractor consistently charged for extra consumables on change orders at various rates. There was no incentive for them to shop for low prices on these items in the subcontract, which caused a cost impact on the project budget.

Enhancement:

Clearly define how consumables are charged for in change orders. Limitations for these costs (a fixed unit rate) should be established in the Subcontract. When an unforeseen change occurs, the Subcontractor can turn in a "not to exceed" estimate for the work based on these costs. A CFC can still be used to expedite the work, but the Subcontractor would be responsible for the bid. Update the General Conditions of the Bid Documents requesting that Subcontractors provide specific unit rate costs for the specified items.

Observation:

During a cost audit conducted by the DOE Reality Officer, it was not clear what actual economic benefit there was for the recovery of recyclables.

Enhancement:

Specifically identify in the bid documents that two bid prices are to be submitted for recyclable materials. One bid where the Subcontractor does not recover recyclable material. The second bid where the Subcontractor does recover as much recyclable material that they deem is economically beneficial. The second bid price should reflect the recycling credit.

Observation:

Three subcontracts were issued for this project: one for strip-out, asbestos abatement, and demolition. However, a significant amount of work conducted under the subcontracts occurred simultaneously. Coordination between the different parities was difficult and interferences occurred which led to work stoppage and confusion of roles and responsibilities.

Enhancement:

Issue one subcontract for the entire scope of the project. Issue a Fixed Price, Turn-Key Subcontract. Dividing a project into phases needs to be carefully considered. Phases may not be distinct enough to avoid complicated sequencing problems (and additional costs) which can occur with multiple subcontractors.

Observation:

The asbestos abatement subcontract for Building 123 was combined with an abatement project in another facility. This created unnecessary complications in preparation of deliverables, requests for payment, fulfilling training requirements, and adapting to schedule changes since the two facilities had completely different bid documents, scopes, radiological conditions, and project constraints. This situation resulted in schedule delays because the Subcontractor did not have the trained resources to support both projects. In addition, the Subcontractor prepared submittals, which were fragmented between the two projects. Submittal reviews and requests for payment reviews were complex and many documents had to be redone.

Enhancement:

Project subcontracts need to be separate from other subcontracts or projects to avoid conflict and competition for resources. Each contract should be managed individually. Then the responsibility to support a project is clearly the Subcontractors.

A.7 Project Documents

Observation:

The decision document did not include early involvement with the Environmental Restoration, Compliance, and Legal departments. Final preparation and review of the document did not include a sign-off sheet verifying that the decision document was complete. This caused the document to be revised/updated four times by project completion.

Enhancement:

Include the above mentioned groups in the planning phase of a project and have the groups listed as reviewing and signatory parties for the final document.

Observation:

Requirements of the Comprehensive Environmental Response and Liability Act (CERCLA) administrative process were not clearly identified during the planning stage of the project. As a result, CERCLA Administrative Records (AR) were not adequately maintained and controlled at the beginning of the project.

Enhancements:

Determine the CERCLA administrative requirements during preparation of the decision document. Assign one team member the responsibility for tracking records prepared for the project and ensuring that the records are maintained and controlled as required. Maintain a log showing the status of documents prepared, which will be forwarded to the AR, and identify who is responsible for each document.

Train the team members on the requirements for developing and maintaining controlled documents and administrative records at the beginning of the project.

Observation:

The PAM, SAP and RCRA Closure Plan were revised several times. Some revisions were necessary due to changes in the project scope. Several revisions were necessary to incorporate untimely comments on documents, which had been finalized. As a result, a significant amount of the team's time and effort was focused on rewriting these project documents, additional comment/resolution, obtaining approvals, etc. rather then focusing on supporting field activities.

Enhancements:

Establish a single POC for departments reviewing documents such as Site Operations, Site Compliance, DOE/RFFO, Environmental Compliance, etc. These POCs should consolidate comments from their organization and be responsible for submitting a single set of comments to the document author. If a review by a legal representative is necessary, again, a single POC for Legal (K-H, DOE, and Rocky Mountain Remediation Services, L.L.C. [RMRS]) also needs to be identified. Multiple reviews by different attorneys ensures multiple, and at times, conflicting direction.

Procedures for commenting on controlled documents must be observed by all reviewers since comments and their resolution must be tracked and archived.

Include time for reviews and signatures in the schedule. Receive all requests, direction, and comments on the project documents in writing. Obtain concurrence on review times before completing the project schedule.

Observation:

The project had to prepare several project documents that were not originally included in the schedule or budget, such as the Concrete Sampling and Analysis Plan, and the project-specific HASP. Again, field support personnel had to limit their time on the jobsite, to write, revise, and complete the additional documents.

Enhancement:

Provide the Project Team with a listing, checklist, and schedule of all documents required for the successful completion of the project. Determine document requirements during the initial planning of a project.

Observation:

The Decision Document (PAM) for Building 123 originally included IHSS characterization. However, this characterization was not adequately planned or funded to meet the characterization requirements for determination of a CERCLA remediation plan. This resulted in confusion in the project commitments and the requirements detailed in the PAM. The IHSS SAP underwent significant revisions to clarify the actual characterization scope of the D&D project. Additional monies were expended to correct the confusion, and to ensure that the documents were consistent.

Enhancement:

Bound the scope of D&D projects to removal of buildings and ensure that the RFCA documents (the PAM in this case) match this scope. IHSS characterization and remediation needs to be managed by the ER Department to ensure that these tasks meet all regulatory and permit requirements. Take the time needed to write reviews, and complete project documents that identify and control project work.

Observation:

Almost 20 documents (plans and reports) were prepared for the Building 123 project. Many of these documents discussed similar topics (i.e., building description and history, health and safety, building hazards, the main project scope, etc.). The accuracy of the information began to change when repeated and summarized in slightly different forms several times. This cost the project additional time and money to manage these documents.

Enhancements:

When preparing the project documents, avoid repeating similar information in each document. Keep the documents as brief and concise as possible, and refer to a master project document containing the applicable information. For example:

- Describe the buildings in one document instead of repeating or paraphrasing that summary.
- The WMP could also be just a table in the PAM, not an entirely separate document.
- Describe project health and safety portion only in the HASP, and the RCRA Closure only in the RCRA Closure Plan, etc.

Review the applicability of issuing one document that covers different areas of work tasks for a project.

A.8 Radiological Characterization

Observations:

The project did not have a working, real-time database for radiological survey data. There was a lag between the time data was collected, when it was reviewed, and determination of problem areas needing resurveying. This contributed to schedule delays and cost impacts.

Overall preparation and control of the radiological survey field documentation was not controlled or consistent between each technician.

Enhancements:

"Final survey data" needs to be correlated with the survey instrument calibration data concurrently. The data needs to be entered and reviewed on a daily basis to identify problem areas which may need resurveyed early in the final survey phase. Use one survey form to collect data so that the information is consistent throughout the project.

Assign a single POC in the field who is responsible for ensuring that the survey plan is being followed as written, that data is not lost, and that data is collected at the end of each shift. Have each technician's name on every data sheet so that if there are any questions, the responsible party is identified.

Observations:

The site did not use the latest technology for radiological operations (equipment, engineering, controls, data management, etc.).

The process of physically obtaining surveys and counting swipes is a time intensive operation. The use of one automated swipe counter (Tennelec) was a definite bottle neck to completing the surveys in a timely manner. Present site instrumentation is not suited for D&D work. This caused the project to experience schedule delays, cost impact, and rework when areas previously completed had to be resurveyed.

Enhancements:

The level of the radiological surveys needs to be established at the onset of the project. The use of more up-to-date radiological monitoring equipment can greatly reduce the time and effort in this area.

Again, have the technicians fill out the data pages, sign, time and date the forms. Then check after that that the forms are completed correctly and have been turned into the single POC.

Experienced radiological personnel need to identify manpower and equipment necessary to complete the work in a manner that supports the project schedule. Invest the time and money needed to write a complete and detailed Final Radiological Survey Plan (FRSP) which includes contingency plans, which allow the technicians to continue working if a changed site condition is encountered. Sufficient manpower and equipment resources must be dedicated to the final radiological surveys to ensure on-time completion of the work.

Observations:

The project did not have release criteria established for all potential isotopes at the beginning of the project. Elevated activity on the floors was attributed to Thorium through gamma spectroscopy performed by offsite contractors. This was not anticipated nor planned for in the original survey plan.

DOE/ RFFO approval/concurrence was required for establishing the release criteria. The presence of Thorium resulted in unique beta release limits for the building structure, which changed as other areas of unknown contamination were encountered. It took approximately one month for a response from the date of the request.

There were limited capabilities on-site for timely isotopic identification. These situations caused the project to experience schedule delays and incur unplanned costs.

Enhancements:

The FRSP needs to be approved before finalizing the final budget and schedule. The plan should identify the limits, boundaries of release, and suspected isotopes. Have the RE plan for and identify how isotopes are going to be managed. A contingency plan should give details of how unknowns are going to be dispositioned.

Observation:

Radiological controls for work conducted by the subcontractors had not been determined prior to award of the subcontracts. This resulted in several change orders to cover unplanned costs.

Enhancement:

Determine radiological controls that will be required by Radiological Work Permits prior to submitting the bid documents.

Observations:

There were not any D&D specific policies and procedures for radiological characterization, release, and documentation. The technical basis for free release criteria was not clearly established, documented, and agreed upon by all parties prior to final survey. This resulted in weekly changes to the survey plan, delays in field work, and increasing downtime costs.

A procedure was not in place at the project site for isolation and control of areas undergoing final radiation surveys prior to demolition. This resulted in a Radiological Incident Report (RIR) which impacted the schedule and budget.

Enhancement:

A procedure for final radiological surveys on D&D projects needs to be developed. The procedure should address postings, training, and necessary controls. These requirements should then be included in work plans for the Site's decommissioning program.

Observations:

The transition of building ownership was not well planned or documented. Meetings set to walkdown the facility with Operations were canceled three separate times.

Significant amounts of equipment, furniture, chemicals, and laboratory wastes, and sources remained in the building after transition of the facility to the D&D Project Team. The remaining items then became the responsibility of the project to remove and disposition. These tasks were not included in the project scope, schedule or budget. The result was the project team having to perform tasks that the individuals were not trained for, expending money and schedule on unplanned tasks, and delays to the start of the strip-out activities.

Enhancements:

Do not accept a facility until the transition process is complete (i.e., the walkdown conducted, a Memorandum of Understanding (MOU) written, agreed to, and signed by both parties).

Closely inspect the building to ensure that all interior property is removed, screened and dispositioned prior to the building turnover and maintain proper documentation of this process.

Assign a single POC to manage the relocation of equipment, waste, personnel, and chemicals to ensure documentation is complete.

Observation:

Building systems were not tested for operation prior to building turnover. Additional resources were required for maintenance of the building systems after transition of ownership to support decommissioning activities (i.e., repairs to process waste pumps and solenoid valves needed for the Perchloric rinse and RCRA closure rinsing). Systems being reported as operational were not verified, and as a result, several utility systems needed repairs and replacement before work could begin thus delaying the start of several tasks.

Enhancements:

There are two options that may be utilized to make the transition between operations and decommissioning more efficient:

1) Prior to the facility transfer from operations to the D&D Project Team, inspect building systems that may be necessary for deactivation and decontamination of the building. Ensure these systems are operating, and that maintenance is complete before accepting the building. If not, include in the project scope to repair the systems needed to support decommissioning.

2) Configuration control, modifications, maintenance, and repairs could be performed by the project. Schedule and budget must be set aside for this option if utilized. The building should not have to meet all existing plant operating procedures (configuration control, modification documentation, quality control of repair materials, etc.). Only maintenance and repairs to systems critical for decommissioning would be necessary.

Completely identify the costs, schedule impacts for system repairs, and incorporate into the project's baseline schedule and budget. Do not assume that the needed systems are operational. Always verify prior to accepting.

Observation:

After transition of the building to the D&D project, additional waste, equipment, and materials were discovered in the building that were stated as being removed prior to transition.

Enhancement:

Develop and implement a security plan that limits access and deters "midnight dumping". Obtain all of the building keys or change the building locks during transition to the decommissioning Project Team.

Observation:

Resources were not originally allocated for a Shift Operating Engineer, Facility Manager, and LO/TO Manager. This resulted in confusion regarding responsibility for signatures and scheduling of support work.

Enhancement:

Ensure budget is allocated for these positions during development of the PEP and clearly define responsibilities during facility transition.

Observation:

Time and funding were used to survey, relocate, and store items of little value. Several times more money was spent on salvaging an item than the salvageable amount of the item.

Enhancement:

Items of minor value (i.e., lock cores, fire valves, doors, overhead pipe runs) need to be discarded or removed during demolition if the value is less than the cost to be retained and processed through the system for storage at the PU&D facility. The value of these items does not justify the labor costs for salvage. Have PU&D make disposition decisions on equipment and property as soon as the schedule allows.

A.9 RCRA Closure

Work with CDPH&E to determine closure standards on a case-by-case basis. If underground piping or soil contamination associated with a RCRA unit does not meet the closure criteria established, propose deferring closure to Environmental Restoration (ER) and do not attempt to close under RCRA.

If underground piping or soil contamination associated with a RCRA unit does not meet the closure criteria established, propose deferring closure to ER and do not attempt to close under RCRA.

Observation:

The Project Team invested a significant amount of time and effort into developing, and revising a closure plan for the RCRA unit within Building 123. However, the RCRA Closure could have been planned, conducted, and approved under the RFCA Decision Document (the PAM). The project developed two separate documents, which used significantly more resources than were required to prepare the documents, manage the reviews, control the documents, and to have two public comment periods.

Enhancements:

Close any RCRA Units using the RFCA Description Document, rather than preparing a separate RCRA Closure Plan.

Assign a knowledgeable compliance expert to review the project scope and participate in planning tasks necessary to meet regulatory and permitting requirements.

Closure standards for RCRA units, and especially for piping and sumps, may be determined on a case-by-case basis with the CDPH&E. For example, Tier I standards may be more appropriate than Tier 2 soil standards or maximum contaminant levels (MCLs) for drinking water. In addition, RCRA closures need to include the language that, "Units that do not meet RCRA Clean Closure Standards will be deferred to ER. ER will rank these areas and determine which, if any, will require soil remediation based upon a risk assessment".

Observations:

The RCRA Closure Plan required that RCRA systems that were decontaminated, to meet MCLs for drinking water to achieve clean closure. These levels are unrealistically low for an old process waste system, which will be abandoned permanently and never used for drinking water. Some components of the RCRA unit did not meet the MCLs. In one situation, the State was consulted and an agreement was made that the additional contamination required no further action (the MCL for Nickel was exceeded by 11 parts per billion [ppb]). In another situation, acceptance had to be obtained from the State to defer closure of the underground piping and one sump to remediation of the Site (the MCL for lead exceeded by 41 ppb in the sump, the MCL for lead was exceeded by 6.7 ppb in the pipe and the MCL for Chromium was exceeded by 488 ppb in the pipe). The time and resources spent working with DOE and the State would have been saved if more realistic, and legally acceptable, standards had been established.

The RCRA Closure Plan for the RCRA Unit 40 allowed for the use of the debris rule to clean close elements of the process waste line. However, after the plan was approved, the CDPH&E interpreted the debris rule as being inappropriate for those portions of a unit that remain in place. Modifications to the subcontract documents had to be prepared and implemented to comply with the new guidance which caused a significant cost impact and schedule delay.

Enhancements:

Use the rinsate standard (as found in the site permit) to achieve RCRA clean closure of any portions of a unit that may remain in-place for a period of time, instead of using the debris rule.

A.10 Asbestos Abatement

Observation:

The asbestos containing floor tile in the halls was damaged during the equipment strip-out phase. This caused the subcontractor to work overtime to place a protective barrier over the tiles.

Enhancement:

Install a protective surface (thin metal sheeting, plywood, or plastic) over asbestos containing tile at the beginning of a strip-out phase to prevent damage to asbestos containing tiles.

Observation:

An RCT decided that a high efficiency particulate air (HEPA) fan was not needed for the small floor tile removal project because of the possibility of radiologically contaminating the unit. However, the HEPA fan was necessary as an engineering control for the asbestos abatement activity. This change contributed to a fiber release. This caused the Subcontractor to wipe down the walls in the area of the fiber release.

Enhancements:

Specifically, any change to the Asbestos Abatement Project Plan (Asbestos Abatement Plan), no matter how apparently insignificant, requires a written change and the approval from the Owner's assigned Facility Manager.

A field modification to any plan, procedure, or subcontract requires the review and concurrence of the SME or responsible person. It is the responsibility of the Owners Representative, and all personnel aware of a proposed change to have the required people review the change and prepare the appropriate documentation (e.g., an ECR, revision to the IWCP, Asbestos Abatement Plan, etc.).

Observation:

The qualified, State Certified Industrial Hygienist for the Asbestos Abatement Subcontractor could not analyze their own air samples with a mobile lab at the work site, as is routinely done in industry. According to the *Acquisition Procedure for Requesting Commodities and Services,* Site Procedure 1-W36-APR-111, all sample analysis must be conducted by an approved laboratory (approved supplier). As a result, the samples had to be transmitted to the RFETS ASD, and then sent to an approved lab off-site for analysis. A Property Release Evaluation and chain of custody documentation had to be prepared for each set of samples, which would not have been necessary if the samples were analyzed at the work-site. This caused the site to wait longer to receive results of their personnel samples and area air quality samples.

Enhancement:

State and Federal regulations establish qualifications for the analysis of air monitoring samples for asbestos abatement. *Acquisition Procedure for Requesting Commodities and Services*, Site Procedure 1-W36-APR-111, needs to be revised to allow analysis of air monitoring samples for asbestos by personnel and laboratories that meet the state and federal qualifications.

A.11 Work Parameters

Observation:

Building 123 was not controlled from the standpoint of excluding those without the same level of training as the workers. This resulted in having individuals onsite without the needed training which is a safety concern.

Enhancement:

Risk Analysis and Needs Analysis needs to be performed prior to project planning, which accurately identifies the level of control necessary.

Observation:

A great deal of effort was invested in containing hazards during the active strip-out activities, separating debris so as to minimize the low-level waste, and to free release a greater amount of sanitary waste. Initially, significant time was spent on additional surveys and segregation when it was actually more cost-effective to declare waste as being low-level waste.

Enhancement:

Make decisions during the planning phase and after the characterization is complete, regarding the classification of waste and disposal.

Observation:

During execution of the project, different work forces worked different schedules, which made coordinating tasks difficult. There were too many instances of lost-time due to conflicting schedules between onsite personnel and the subcontractors.

Enhancement:

Establish the same working hours for all personnel (the Owner's Project Team, RCTs, and subcontractors) during the execution stage of a project. State the work hours in the Bid Documents and make it a subcontract requirement. Consider negotiating with Union authorities to establish project-specific working hours. Also, consider negotiating changes in break, lunch, and end of shift to increase productivity (e.g., moving morning break time to the lunch break, and moving the afternoon break to the end of the shift).

Observations:

The lack of D&D programmatic documents has resulted in an inconsistent approach to the way that projects or plans are developed and implemented. This may be improved with a D&D policies handbook. If the handbook does not receive the correct input from affected organizations it will become problematic.

Enhancement:

Programs and procedures are being developed for D&D projects by K-H and RMRS, and will address characterization as this is the key task in planning, scheduling, and cost estimating. The Project Team must develop a consistent approach to implementing all activities.

Observation:

The waste streams were not adequately identified before the start of the project. Other wastes were encountered that were not planned for and there was no contingency plan to handle this situation. This resulted in changes to the WMP, and additional costs in training the subcontract personnel to handle the waste.

Enhancement:

Write and distribute for review a Waste Management Contingency Section into the WMP that addresses what actions are to be taken if unknown and/or unanticipated wastes are encountered.

Appendix B

Action Plan

B123 D&D PROJECT
LESSONS LEARNED ACTION PLAN

	B123 LESSONS LEARNED	Feasible/ Desired Y/N	Existing Process Y/N	Priority[1]	Comments	Actions Needed	Resources	Actionee	ECD
4.1	SAFETY								
1	Minimize Extended Work Hours	Y	Y	A	• Adequate Planning should minimize OT.	• Include discussion in D&D Program Manual.	Facility Disposition Program Manual (FDPM)	TJ Wirth	10/1/98
2	Entry into Project area by inadequately protected personnel	Y	Y	A		• Consider other means of entry barrier, (i.e., locked gates).	FDPM	TJ Wirth	10/1/98
4.2	PLANNING								
3	Conduct Planning Risk Analysis Obtain characterization data prior to PEP development.	Y Y Part/Y	Y Y	A A2 A1	• Risk Analysis was not adequate. • Discussion on Risk Analysis. covered in D&D Program Manual. • Risk Analysis/Contingency Analysis to deal with Project uncertainties was inadequate. • Lack of Characterization lead to multiple scope changes. • Linear phasing of the Project's key activities may not always feasible. • Risk/Contingency Analysis is key to managing uncertainty. Discovery issues cannot be preplanned. • If adequate characterization is done, then discovery issues are minimized. • PM should use historical documentation as well as interviews with prior workers from the building. This may include calling individuals if they have left the site.	• Ensure Project Plan & Schedule address this. • Evaluate need for Template/Example. • Review D&D Checklist for this Element. • Ensure Project Plan & Schedule address this. • Evaluate need for Template/ Example. • Review D&D Checklist for this Element. • Ensure Project Plan and schedule adequately address this. • Develop Characterization Process • Review ASP for characterization guidance & discovery issues. • Evaluate the feasibility of a Phased-Approach in the PEP. • ***See Case Study for Action 1,2 & 3 for Characterization.*** • ***Also see Item 16 below.***	FDPM FDPM ***See Case Study, for Action 1 (1)***	TJ Wirth PM TJ Wirth	10/1/98 10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

4	Establish PEP Assumptions	Y	Y	A	• ***See Item 3 above.*** • Guidance provided in the FDPM.	• ***See Item 3 above.***	FDPM	TJ Wirth	10/1/98
	Review point in process for Davis-Bacon Determinations	Part/Part	Y	3	• Early determination of DB is often necessary for initial budgeting purposes. Perform an INFORMAL determination for planning. • Consider Phased Budgeting - that is prepare budget & schedule for characterization, and estimate for planning & execution with the outcome of the characterization. • This can be worked with DOE upfront so that if a BCP is needed, it's already anticipated and partially pre-approved.	• Ensure the PEP identifies assumptions on the ability to make Davis-Bacon determinations only when adequate characterization is at a certain stage. • Provide discussion of a Phased-Approach in the PEP.	FDPM	TJ Wirth	10/1/98
	Establish Cost Collection & Tracking at sufficient level of detail necessary for subcontracted work.	Y	Y	A	• Project Controls has always been an issue. • PM consider having a full-time person assigned to Project Controls on the Project Team to maintain budget tracking and schedule updates.	• Ensure project control mechanisms are in place for the project. • Review/modify existing Project Controls template for inclusion into the D&D Program Manual.	FDPM FDPM	TJ Wirth	10/1/98
	Conduct D&D Cost Tracking & Categorization	Y	Part	A3	• Cost Tracking is a part of the PC responsibilities. What needs to happen is a sharing of information for other D&D projects. • Need to consider tie-in to the Web-Site.	• ***See Items 10 above, 15 below.*** • ***See Case Study for Action 3.***	FDPM	TJ Wirth	
	Integrate Environmental Readiness Evaluation (ERE) into schedules	Y		A	• ERE process is part of ensuring the activity is ready for execution.	• Ensure ERE is included in Project Plan and Schedule. • Verify ERE process completion. • Verify ERE Checklist is in place.	PM Action per Project CP Engineering & Integration FDPM	TJ Wirth	10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
(Note: Several actions may have same priority due to parallel efforts.)

	Conduct Engineering Walkdowns after Facility evacuation	Part/Y	Y	1	• Reliance on As-Builts drawings were not for characterization data. The project needs to verify but cannot do so until the building is unoccupied and/or areas are made accessible. • Consider performing characterization during off hours where equipment or furniture can be moved or accessed.	• Ensure Project Plan and schedule adequately address with characterization. • Ensure technical issues are discussed in the assumptions section, (e.g., cannot do destructive testing in areas where labs samples are being analyzed). • Evaluate the feasibility of conducting off-shift characterization where intrusive or destructive testing may be necessary. • Develop Characterization Process.	FDPM	TJ Wirth	10/1/98
	Identify CERCLA requirements during planning phase.	Y	Y	A	• The ASP identifies use of teams and SMEs in the planning and development of Plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents. • Individual can perform periodic checks throughout the duration of the project to ensure team is following requirements.	• PM should enlist the support of individuals knowledgeable in CERCLA when planning and scheduling work to ensure adherence to requirements. • Develop Characterization Process. • Review ASP for guidance • Include discussion on Procurement strategies in D&D Program Manual. • Develop Closure Path process/procedure.	FDPM	TJ Wirth	10/1/98
	Establish POC for review of PAM, SAP, and RCRA Closure Plan documents	Y	Y	A	• The ASP identifies use of teams and SMEs (POCs) in the planning and development of plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents. • Per Site Document Requirements Manual (SDRM), POC are identified for K-H and each primary contractor. Consider use of these individuals for review/comment.	• Its within the PM purview to establish a POC for this purpose. This would be included in the Projects Organization Chart and Individual Roles & Responsibilities.	FDPM	TJ Wirth	10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

	Identify necessary project requirements for planning purposes.	Y	Y	1	• Adequate characterization and review of characterization data by the Project Team and SMEs should have concluded the need for the Concrete Sampling and Analysis Plan and HASP. • ASP provides a list of required planning elements. • D&D Program Manual provided possible Project support documents . • PM responsible for ensuring all requirements are in place.	• PM to ensure the support of individuals knowledgeable in these areas when planning and scheduling work to ensure adherence to requirements. • Develop Characterization Process. • Review D&D Program Manual list of elements. Look at inclusion into Project Templates. • Review/Integrate with ASP. • ***See Case Study for Action 1,2 and 3.***	FDPM	TJ Wirth	10/1/98
	Streamline use of similar information in Project documentation	Y	Y	A 3	• Repetitive information in multiple project documentation is time consuming, leads to possible mistakes and inconsistencies, and multiple / unnecessary revisions when core information changes. • Consideration of Integration or linking (pointing to) similar information in one master document should be made.	• ***See Case Study for Action 3.***	FDPM	TJ Wirth K.A. Dorr	10/1/98
4.3	CHARACTERIZATION								
	Schedule adequate time for characterization (destructive) and generate RCLR only after deactivation	Part/Y		1	• ***See Case Study for Action 1 (1) (2) and Item 4.2 (7) (16) above.***	• Ensure Plan and schedule addresses this. • Incorporate into the D&D Schedule Templates.	FDPM	TJ Wirth K.A.Dorr	10/1/98
5	Develop guidance plan on DQOs for characterization activities and standard format for SAPs	Y	Y	1	• A standard format for building characterization, retention, and management of records, DQOs, etc is needed. Need to coordinate with ER. • ***See Case Study for Action 1 (1) and Items 4.2 (7)(16) above***	• Develop Characterization Process. • Look at possible Template. • Coordinate with ER on requirements. • Provide list of requirements in D&D Program Manual.	Characterization Procedure FDPM	T. Scott TJ Wirth	10/1/98 10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

6	Coordinate types of sampling needed for the project with the Analytical Projects Office. *Also see #9.*	Y	Y	A	• The ASP identifies use of teams and SMEs in the planning and development of Plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents.	• PM ensure the support of individuals knowledgeable in sampling when planning and scheduling work to ensure support from necessary organizations or need for alternatives. • Develop Characterization Process	Characterization Procedure Characterization Project Lead	T. Scott T. Scott	10/1/98
7	Clearly state assumptions and limits in Characterization Sampling Plans	Y	Y	A 1	• ***See Case Study for Action 1 (1) and Item 4.2 (4) above.***	• Ensure Plan and schedule covers this. • Develop Characterization Process.	Characterization Procedure	T. Scott	10/1/98
8	Obtain destructive characterization data	Y	Y	1	• ***See Case Study for Action 1 (1) and Item 4.2 (4) above.***	• Ensure Plan and schedule covers this. • Develop Characterization Process.	Characterization Procedure	T. Scott	10/1/98
9	Identify all necessary analysis on samples prior to shipping for analysis	Y	Y	A	• The ASP identifies use of teams and SMEs in the planning and development of Plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents.	• Ensure enlistment of support from SMEs knowledgeable in sampling when planning & scheduling. • Develop Characterization Process.	Characterization Procedure	T. Scott	10/1/98
10	Implement more timely radiological survey assessments	Y	Y	A2	• The ASP identifies use of teams and SMEs in the planning and development of Plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents.	• PM ensure the support of individuals knowledgeable in sampling, planning, and scheduling work to ensure support from necessary organizations. • It's within the PM purview to establish a POC for this purpose. This would be included in the Projects Organization Chart and Individual Roles & Responsibilities. • Ensure Plan and Schedule address this. • Develop or Review existing Rad Survey Plan Template/Guidance.	FDPM	TJ Wirth J. Barroso	10/1/98
11	Identify required Radiological personnel and equipment resources	Y	Y	A	• ***See 4.3 (10) above.***	• ***See 4.3 (10) above.***	FDPM	TJ Wirth	10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

	Establish Release Criteria for building debris.	Y	Y	2	• ***See Item 4.2 (3), 4.3 (10) above.***	• Consider the feasibility of a standardized Radiological Final Survey Plan Template which contains the release criteria for all possible isotopes at the site.	FDPM	TJ Wirth K.A. Wirth	10/1/98
	Establish Free Release Criteria	Y	Y	A 2	Generate a specific survey Plan for how the final surveys are to be handled. • ***See 4.2 (3), 4.3 (10,11) above.***	• Review D&D Program Manual for listing of a survey plan.	FDPM	TJ Wirth	10/1/98
4.4	FACILITY TRANSITION								
	Establish Transition Turnover standard	Y	Y		• Ensure an agreement and a standard is used to institute facility turnover.	• Utilize existing /procedure (or MOA) and have current and future Facility Owner agree.	FDPM	K.A. Dorr	10/1/98
	Establish functionality of facility systems needed for D&D	Y	Y		• Needed systems are not operational for D&D. This costs time and money to re-activate or re-install.	• Coordination with Current & Future Facility Owner should be made prior to Deactivation efforts to ensure systems. needed for D&D *are not shut* down or torn out. • Establish protocols /procedure (or MOA) and have current and future Facility Owner agree. • Assess needed systems for D&D, budget, and plan for repairs as necessary for D&D work. • Develop Characterization Process.	PM Action per Project Facility Transition Procedure FDPM Characterization Procedure	(PM) TJ Wirth K.A. Dorr T. Scott	10/1/98
13	Identification of Project Resources	Y	Y	A	• The ASP identifies use of teams and SMEs in the planning and development of plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents.	• Enlist the support of knowledgeable individuals in these areas. • Ensure Plan and Schedule address this. • Develop Characterization Process. • Review/Modify ASP, Team Section.	FDPM	TJ Wirth K.A. Dorr	10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

4.5 PROJECT EXECUTION									
14	Establish Project Team training	Y	Y	A	• Use of Training Matrix per the Project Plan.	• Ensure Contract has specified training requirements. • Review Procurement Contract Template for Training language. • Review Training discussion in ASP/CPI. • Evaluate need for Training Plan.	FDPM	TJ Wirth K.A Dorr	10/1/98
15	Identification for Project Resources (Facility Manager, LO/TO, etc.)	Y	Y	A	• The ASP identifies use of teams and SMEs in the planning and development of plans and schedules. This ensures incorporation of necessary requirements and practices into planning documents.	• Enlist the support of knowledgeable individuals in these areas. • Ensure Plan and Schedule address this. • Review/Modify ASP, Team Section. • Include discussion in D&D Program Manual. • See Item 4.2 (9), 4.4 (13 above.	PM Action per Project FDPM	K. A. Door TJ Wirth	10/1/98
16	Streamlining Project documentation and determination of closure standards	Y	Y	2/3	• *See Case Study for Action 1, 2.*	• *See Case Study for Action 1, 2.*	FDPM	TJ Wirth	10/1/98
17	Use RCRA Closure rinsate standard instead of debris rule				• Need to define the requirements during characterization prior to budget.	• Have WM evaluate this process and determine application for future projects.	Characterization Procedure	T. Scott	10/1/98
18	Establish Asbestos containing furniture/equipment protective measures.	Y	Y	A 1	• Hazard Identification and establishment of controls is part of the hazards assessment process. • Key organizations participate in this process and establishing controls accordingly. • If subs are doing all the Hazards assessment, utilize independent evaluation by safety oversight groups. • ASP establishes requirements and guidance for conducting HAs. • ASP requires use of SMEs for HAs.	• Ensure dissemination of safety controls. • Re-evaluate how Hazards Assessments and Controls development were conducted for this project. • Include discussion in assumption section of project plan. • Develop Characterization Process. • *Verify existence of Asbestos* Abatement procedure and existence of controls.	(PM Action per Project) FDPM Characterization Procedure	K.A. Dorr T. Scott	10/1/98

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
***(Note:** Several actions may have same priority due to parallel efforts.)*

<u>Case Study - 9 Total</u>

3 Other
7 PM Guidance of which:
  2 - Involve Roles & Responsibilities
  1 - Involves Characterization
  4 - Involve Other Site Issues

<u>Lessons Learned - 58 Total</u>

14 (25%) Involve Other Site Issues
44 (75%) Involve PM Guidance of which:
14 (31%) Involve Characterization Issues
14 (31%) Involve Roles & Responsibilities Issues
16 (38%) Involve Planning, Contract, Scoping, Management, Other

A - Should be done by PM now, 1 - First Priority, 2 - Second Priority, 3 - Third Priority
*(**Note:** Several actions may have same priority due to parallel efforts.)*

Appendix C

Radiological Operations and Radiological Engineering

Summary of Problems and Symptoms

LESSONS LEARNED BUILDING 123
MAY 20, 1998

Introduction:

RMRS took over the responsibility for Radiological Operations and Radiological Engineering from Safe Sites of Colorado (SSOC) on March 27, 1998. With this change in responsibilities, RMRS also assumed responsibility for the D&D of Building 123. This project was originally scheduled for completion in February 1998, but due to a number of identified problems was not completed until late May.

This project has been important as one of the first major building closures at RFETS under Kaiser-Hill's leadership and the lessons learned from this project will be very helpful in the successful efforts of future building closures. On May 20, 1998, the Program Compliance organization of RMRS held a "lessons learned" meeting to learn from the 123 project. Another meeting was later held with the RCTs involved in the project and that input has been added to this report.

This information will be shared with others resulting in the development of a set of action plans targeted at the improvement of building closure projects. Lessons Learned from Building 123 will be immediately applied to the work on Buildings 886, 779 and T-1.

Areas of Success

- Remediation identified and completed quickly
- No substantial injuries (One Occupational Safety and Health Agency [OSHA])
- DOE assessment - no technical issues - free release
- DOE Orders clarified for radiological release
- Move of radiological organization to RMRS
- Teamwork grew stronger with project
- New technology - used and implemented quickly
- Alignment of players helped speed up new technology
- Data recovery
- Strong personal commitment
- Controls stayed in place - in spite of schedule slips
- Excellent support from K-H
- Implemented "MARSSIM" (very significant!)
- Raised standards of performance
- Increased level of expected quality
- Good detective work
- Final survey plan was technically defensible; laid groundwork for new procedures
- Northwest report was a good document
- Applied lessons learned from East Wing report
- Stayed away from accusations - stay focused on the mission
- Identified areas for improvement
- 123 can become a good success story
- Project Team worked hard to keep the project moving

Corrective Action Implemented During the Project

- Improved field supervision of RCTs
- Recognition of resources required
- Changed importance of resource assignment
- DMR (procedure revisions)
- New forms - procedures
- Training of RCTs
- Five o'clock meeting provided corrective actions

- Radiological operators change to RMRS
- Assigned full time foreman on project
- Changed the format for RCT data
- Team had a focus
- Organized around the importance of closure
- Good idea of what was acceptable
- Minimized road blocks
- Changed business-as-usual mentality
- Scope event - upgraded building from a Class 3 to a Class 1 Radiological facility
- SSOC provided independent review
- Increased internal review
- New instrumentation used

Problems and Symptoms Identified (Group 1)

1. Inconsistent survey performance & documentation
2. MARSSIM Implementation - midpoint - too late
3. Changing expectations & directions from customer
4. Produced low quality Radiological data
5. Poor document control process
   - No central control collection coordination
   - Control was at wrong level (RCTs)
6. Characterization Surveys. NOT performed at right time and in-process surveys
7. Release surveys standards are different now then when B123 went from lab to office space
8. Survey implementation plan was not followed
9. Multiple RMRS Project Manager and K-H "HELP"
10. Background Survey Study was not well-characterized and well-defined
11. Building assumed to be a non-Radiological risk - by the Project & Radiological Engineering -
12. No dedicated RCTs, foremen and Radiological Engineer Support Team
13. Manual entry of survey data - under-utilizing computer capabilities
14. Forms and Format developed as project progressed
15. No procedural basis for assessing bulk media samples
16. Building not in one physical state for final surveys (Floor tiles removed)
17. Distributed raw data to K-H and DOE without good prior review
18. Issued Preliminary Reports prior to proper internal reviews. Need more structured customer relationship on deliverables
19. Use of Shonka Instrument had limited value due to physical limitations and crossover areas to manual surveys
20. Lack of Analytical Lab support - radiochemistry and gamma spec. (in situ)
21. Project Schedule was improperly resource loaded
22. PODs took away from work from getting done
23. Lack of airborne baseline survey
24. Pre-training of all workers (asbestos, fall protection, lead, etc.)
25. Know who your "buddy" is!
26. Programmatic weaknesses in Site Radiological Con program

Problems Summary (Group 1)

- No D&D procedure and technical basis established
- Inadequate overall document control - surveys to final report
- Technology Utilization - surveys, instrumentation, on-site computers and state-of-the-art Radiological instruments
- Project management issues
  - No Strategic Plan
  - Poor project Implementation/PODs
  - Poor project documentation (report)
  - Delayed projects Closure

- Dedicated Team established too late
- Analytical lab support

Problems and Symptoms Identified (Group 2)

1. Inconsistent supervision
2. Assumption that B123 would be easy
3. No established protocol or program for the final Radiological survey
4. Sequence of events not well defined
5. Poor characterization
6. Parallel actions with surveys and release
7. Multiple surveys due to lack of planning
8. Relocation of building occupants was delayed
9. Funding allocation not timely
10. Early review of survey work was not done
11. Correction was done in too large of pieces
12. Did not understand the magnitude of the project
13. Lack of capability to perform gamma-spec and isotopic detection on-site and in a timely manner
14. Lack of direction for the RCTs
15. Poor method of collecting RCT data and inadequate survey equipment
16. Poor data flow path
17. No established method for phasing the project
18. Too many single points of contact
19. Changes in the Project Team
20. Poor maintenance of the scope of work
21. POD timing delayed the morning work schedule
22. Inadequate training for the RCTs
23. Site standards need to be updated
24. No dedicated crew of RCTs
25. RCTs not involved in the planning
26. Inadequate workforce
27. Inadequate preparation for remediation
28. Inadequate equipment
29. Limited radiological management skills in D&D work
30. Inability to meet the schedule
31. Inability to resolve comments
32. Customer had different priorities
33. QC involvement was lacking

Problems Summary (Group 2)

1. Inadequate D&D skill and experience
2. No established protocol or program for D&D work
3. Limited resource availability
4. Limited project expertise
5. Limited understanding of customer expectations
6. Inadequate equipment and instrumentation available on-site

Problems and Symptoms Identified by the RCTs

1. Lack of communication (written and verbal)
   - What is the completion date?
   - What is the critical path item?
   - No plan of action - just assignment
   - Final survey plan was unknown to most
   - Rules kept changing

- Rules for the project were established by Radiological engineering
- Project was viewed as "not important" and "no big deal" by RCTs
- Sporadic crew. RCTs were switched out often with no concern for consistency
- Management needs to have more involvement with the crew leaders.

2. Lack of Supervision
   - Crew leaders had to function as foremen
   - RCTs experienced anger, frustration and apathy due to lack of support
   - Management came by asking "why" instead of explaining the path forward

3. Lack of Organization
   - Surveys lost
   - More work was assigned per day than could be done
   - Too many workers would "hang out" in 113
   - Too many managers would "walk in" to 113

4. Insufficient Resources: Computers, Calculators, and Instruments
   - Building 113 was not adequate to accommodate the resources needed for the tasks assigned
   - Front-end planning was not realistic
   - Too much management in Bldg. 113

5. Lack of D&D Experience with unrealistic project expectations

6. Management did not know of the historical knowledge of the RCTs to assist in assessing the radiological issues that would be faced with Building 123

Consensus Summary of Problems Identified from Building 123

1. No RMRS D&D programs and procedures for radiological characterization, release and documentation. Technical basis for release criteria not established and agreed upon by all parties prior to final surveys. This resulted in frequent changes in expectations and project direction.

2. Limited RMRS radiological D&D technical knowledge and experience. Training at all levels was not sufficient to support the timely completion of the project

3. Limited capabilities on-site for timely isotopic identification.

4. A RadCon project team was not assembled at the front-end of the project. Rad/Ops (RCTs) needed to be included in the overall planning process.

5. Weak overall preparation and control of documentation.

6. Insufficient project integration led to poor communication, inconsistent direction and delayed implementation.

Other Good Ideas from the discussion

- Representatives from the 123 Lessons Learned team should meet with key individuals from Buildings 779, 886 and T-1 to share corrective actions that can be applied immediately.

- All action plans should include corrective actions that can be implemented within the nest two-three months.

- All major project plans involving completion criteria should be reviewed with Clegg, Hank and Fred prior to the initiation of work. If appropriate, the customer should be present for these project reviews with senior management.

Action Plans

Completed action plans will include the following:

- A Problem statement with an identified measurable outcome.
- Scenarios for possible corrective action.
- Recommended corrective action to be taken.
- Action steps to be taken and estimated completion schedule.
- Benefits to be gained by RMRS from plan implementation.

PROBLEM STATEMENT #1:

The Rocky Flats Environmental Technology Site lacks a formalized D&D Program which implements the final Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) which directs the radiological characterization, evaluation, documentation and disposition of facilities undergoing decommissioning.

POSSIBLE CORRECTIVE ACTIONS:

1. SSOC and RMRS develop separate plans and procedures to implement MARSSIM.
2. Transfer the burden of developing a D&D Program to K-H.
3. Develop procedures and plans to implement MARSSIM at the Project level.
4. Develop a Site D&D Program by establishing a team of qualified individuals.

RECOMMENDED CORRECTIVE ACTION:

The following recommended corrective action was chosen to ensure representatives from all companies with interests in Site closure are included on a Team whose goal is to develop a program that will ensure a defensible, consistent and efficient method of deactivating and decommissioning facilities.

Assemble a joint team responsible for the development of technical basis documents (TBD), procedures and training courses which implements the guidance provided by the final MARSSIM into a formalized and approved Site D&D Program.

When complete, the TBDs, procedures and training courses will be approved by K-H and forwarded to DOE for endorsement. The Site D&D Program will be made available to the State for their review. Each D&D Project will develop specific survey plans in accordance with the protocol provided through the D&D Program. Project specific survey plans will be approved by K-H and reviewed by the DOE and State prior to commencing surveys.

ACTION STEPS TO BE TAKEN:

Programmatic Level:

1. Formalize the Radiation Survey and Site Investigation Process through the development of technical basis documents, procedures and training courses.

Project Specific Aspects Regarding the Implementation of MARSSIM:

1. Develop a common format to be used for:
   a) Strip-out plan which provides clear guidance as to what condition the building must be in prior to implementing MARSSIM.
   b) Survey plan, which captures the aspects of the Sites D&D Program.
   c) Close-Out Report where an emphasis is placed on the ability to review the document.
2. Develop a technical basis for material backgrounds at a project level to account for differences in the materials used in the construction of specific facilities.

ACTIONS COMPLETED AS OF JULY 31, 1998

1. Key individuals from SSOC and RMRS Radiological Safety have been identified as SMEs for D&D.
2. These individuals have been scheduled for MARSSIM training.

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

An approved D&D Program would ensure that future D&D Projects will be completed in a consistent and efficient manner better supporting the Kaiser-Hill Team goals for timely Site Closure.

PROBLEM STATEMENT #2:

Limited RMRS radiological D&D technical knowledge and experience. Training at all levels was not sufficient to support successful project completion.

CORRECTIVE ACTIONS AND STATUS AS OF JULY 31, 1998:

1. Implement MARSSIM training for Radiological Engineering. MARSSIM training has been scheduled and will take place at Rocky Flats Environmental Technology Site during July and August of 1998. – COMPLETE
2. Develop and provide a training course for Radiological Control Technical Supervisors (RCTs) and Radiological Control Technicians (RCTs) on the fundamentals of D&D work. – IN PROGRESS
3. Establish a core D&D team of Radiological Professionals (this will include Radiological Engineers, Programmatic Health Physicists, RCTs, and RCTs). A revised Organizational Chart has been developed and submitted to RMRS Senior Management to provide a D&D Core Team for current and future D&D project design, implementation, and oversight. – COMPLETE

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

The aforementioned corrective actions will provide a knowledgeable team of Radiological Professionals for utilization by the Project Management Team. These actions will enhance the D&D Program as described in Problem Statement #1 and ensure a consistent compliant approach is taken on all current and future D&D activities.

PROBLEM STATEMENT #3:

Limited capabilities on site for timely isotopic identification.

CORRECTIVE ACTIONS AND STATUS AS OF JULY 31, 1998:

1. Improve and acquire Gamma Spectroscopy/Radiochemistry capabilities
   - Evaluate Gamma Spectroscopy and radiochemistry needs based on RFETS radionuclide source terms. Specific needs for 1-Paint, 2-Roof media, and 3-Wet chemistry. ECD 8/31/98
   - Determine feasibility of performing specific analytical measurements, including LLDs associated with the DOE "No Rad Added Program". ECD 9/18/98
   - Determine off-site services available for competitive bid process, should capabilities not be available on-site. ECD 10/2/98
   - Define dedicated services, if available on-site, for priority processing of RMRS D&D and ER project needs. Specify minimum and maximum processing time, level of confidence, and reliability of results required to facilitate safe work. ECD 10/23/98
   - Provide technical specifications and requirements to meet analytical needs for procurement, purchase or lease, or service by Project Management. ECD 12/11/98
2. Improve radiological technical survey instrumentation and software documentation.
   - Review industry for state-of-the-art survey instrumentation for D&D and ER projects based on RFETS radionuclide source term, MDAs required, and survey techniques to comply with MARSSIM. ECD 8/31/98
   - Determine computer hardware and software support needs to transfer and collect data from survey instrumentation and produce survey results documentation. ECD 8/31/98
   - Determine MDAs and LLDs required to meet the DOE "No Rad Added Program" and ensure technical basis for new instrumentation meets these requirements, ECD 10/01/98
   - Obtain RSDIC approval for use at RFETS. ECD 10/18/98
   - Using instrument technical manuals, develop operation and calibration procedures. ECD 11/30/98
   - Provide specifications for procurement of instrumentation for purchase and/or lease by Project Management. ECD 11/30/98
   - With support of SSOC Radiological Safety Training, develop lesson plans and train REs, RCTs, RCTs, and supervision on instrumentation use, limitations, and methodologies to be employed during D&D and ER projects. ECD 12/31/98
3. Define and acquire radiological control facility and resource needs to support D&D project work.
   - Establish a team to: determine minimum labor and technical resource needs, REs, RCTs, and supervision to support D&D project work including, planning, implementation, oversight, and reports. COMPLETE
   - Define office space, electrical needs, and environmental conditions required to support Radiological Control activities. ECD 10/01/98

- Determine minimum quantity and types of instrumentation and air sampling equipment required to support D&D project work based on source term assessments. ECD 11/01/98
- Determine training requirements for Radiological Controls personnel. ECD 12/01/98

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

The aforementioned corrective actions will provide RFETS with the knowledge and ability to procure and utilize state-of –the-art D&D equipment to ensure regulatory compliance and produce quality data packages. In addition resource allocation and utilization for current and future projects will be more clearly understood thereby aiding in project planning, scheduling, and costing.

PROBLEM STATEMENT #4:

A RadCon project team was not formed at the front end of the project Rad Ops. (RCTs) and Radiological Engineering Personnel need to be included in the overall planning process

CORRECTIVE ACTIONS AND STATUS AS OF JULY 31, 1998:

1. Establish a core D&D team of Radiological Professionals (this will include Radiological Engineers, Programmatic Health Physicists, RCTs, and RCTs). A revised Organizational Chart has been developed and submitted to RMRS Senior Management to provide a D&D Core Team for current and future D&D project design, implementation, and oversight. – COMPLETE

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

The aforementioned corrective actions will provide a knowledgeable team of Radiological Professionals for utilization by the Project Management Team. These actions will enhance the D&D Program as described in Problem Statement #1 and ensure a consistent compliant approach is taken on all current and future D&D activities.

PROBLEM STATEMENT #5:

Weak overall preparation and control of documentation

CORRECTIVE ACTIONS AND STATUS AS OF JULY 31, 1998:

1. Standardize maps and forms for use during D&D projects. The issuance of the RSP Manual provides standardized templates for radiological work. In addition the forms and maps created during the B123 project are being utilized as templates for future D&D activities to ensure compliance with record keeping requirements as directed by MARSSIM. - COMPLETE

2. A standardized document control process is being developed out of B549 Radiological Operations Office. This process will include proper storage, retrieval, and archiving of nuclear records as directed by site standards and regulatory directives. Although this activity is already in progress, the ECD is 12/31/98
3. Toolbox briefings have been given by the RCTs to the RCTs assigned to RMRS projects detailing the importance of procedural compliance, record-keeping liability, proper flow path for radiological records, and utilization of standardized maps and forms. COMPLETE

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

Nuclear records will be handled in a professional, compliant manner that will ensure proper storage, retrieval, and archiving of such documents. This will enable the project team easy and reliable access to the data no matter what stage of the process the data is currently involved.

PROBLEM STATEMENT #6:

Insufficient project integration led to poor communication, inconsistent direction and delayed implementation

CORRECTIVE ACTIONS AND STATUS AS OF JULY 31, 1998:

1. A Project Managers Handbook has been created and reviewed by all Project Managers. - COMPLETE
2. Executive oversight to review project plans prior to project initiation has been developed in the form of an Organizational Change as discussed in Problem Statement #2 and #4. This has been proposed to Senior Management and approval is anticipated by 9/30/98.
3. An increased emphasis on project management skills needed to manage D&D projects have been addressed in the RMRS Project Management Qualification Process. This process began in December of 1997 and will continually provide Project Managers with the tools necessary to effectively manage their personnel and projects. - IN PROGRESS

BENEFITS GAINED FROM PLAN IMPLEMENTATION:

Project Managers, with the support of Senior Management and Site procedures, will be able to effectively and efficiently manage their projects.

Attachment 1

Independent Assessment of the Perchloric Flushing Procedure

Review of the Perchlorate Decontamination and Hood Removal Procedure Proposed By Resource Technologies Group, Inc. For Building 123 Strip-Out Project

A review of the Resource Technologies Group, Inc. (RTG) procedure to decontaminate and remove potentially perchloric acid contaminated hoods has been made. The procedure follows the accepted practices as used at other DOE Sites, namely wetting of surfaces followed by cleaning and testing of surfaces and cutting or removal of ducts and equipment after cleaning. The procedure follows the accepted procedures as developed by Oak Ridge National Laboratory in "Perchloric Acid Contaminated Hood Decontamination Procedures" (Martin Marietta Energy Systems, Inc. 1993), the guidelines as indicated in the National Fire Protection Association (NFPA) "NFPA 45 Standard Fire Protection for Laboratories Using Chemicals," 1996 Edition, and the CRC Handbook of Laboratory Safety.

<u>Summary</u>

After reviewing the Building 123 Perchlorate Hood Decontamination and Removal Procedure; surveying the systems involved and discussing the proposed methodology with the RTG staff, we suggest the following recommendations or actions to enhance an excellent procedure:

1. Empower the RTG project manager or designee to make field adjustments to the procedure to enhance the safety of the process and make operational changes as necessary.

2. Add the comment that misting, while desirable, may not be necessary. Note: Misting is, however, an additional safety measure that further reduces risk of fire or explosion involving perchlorates.

3. The D&D work should occur in the following order; wet, clean, test, and remove stack, fan, ducts, scrubber, ducts, and hoods.

4. When disassembling the systems, avoid aggressive manipulation of flanges, gaskets, seams, access plates, dampers, nozzles or any area that may contain perchlorate residues.

5. Inspection of the roof duct work system noted that inspection panels were retrofitted on the piping for maintenance and inspections. To our knowledge, we have never observed this on other DOE hood ducts systems and as an additional degree of consideration, it would be recommended that these panels be left in place and removed under water

6. Flanges, gaskets, access plates, dampers, bolts and screws should be removed from the system without disassembly by cutting around these areas. Disassembly of these devices should occur under water.

7. Where the duct enters the top of the hood, cut the duct above the hood throat (avoiding the welded seam) and either remove the top of the hood in one piece or cut around the duct entry seam and remove.

8. When removing hood baffles and internal fixtures, avoid torquing or unscrewing the bolts/screws. Use nibbler cutters, wet grinders or other similar wetted cutting devices.

9. Hood panel/baffle coating materials should be removed under water, or continuous water spray. As should all sealants and coated surfaces inside the hood.

10. When cleaning, to access the inlet side of the fan (if the fan is equipped with rubber flex joints) cut the flex joints (ducts) under a steady stream of water. If no flex duct is present, clean and cut one or more fan blades to gain access to the fan inlet and continue to wet and clean.

11. Change the AHA to reflect the above changes.

12. Aluminum jacketed insulation should be cut and peeled away from duct work with continuous inspection of the insulation for potential leakage. The duct interior should be wetted during insulation removal. An alternative method would be to wet cut a segment of the insulated duct (4 inches) until duct work is exposed and wet cut duct. Do this on two ends, wrap wet in plastic and remove to wash down tank for submerged removal of contaminated insulation and cleaning of duct.

13. Additional materials and equipment to include powered lifts to remove fans and duct work from the roof and wash down tanks sufficient in size to allow complete submersion of all segments should be considered. Also non sparking extension rods (PVC or equivalent), sponges and plenty of 6 mil plastic should be on hand.

By: Charles C. Phillips

Charles C. Phillips
PhD, CIH
ORNL-Office of Safety and Health Protection

Marwan Bader
Marwan Bader
MD, CIH
ORNL-Office of Safety and Health Protection

Attachment 18

Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148

at Building 123

Data Summary Report

Attachment 18
RF/RMRS-98-253.UN

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

INTEROFFICE MEMORANDUM

DATE: September 25, 1998

TO: John Law, Environmental Restoration, T893B, X4842

FROM: Vern Guthrie, Construction Projects, T891C, X7419 Vern

SUBJECT: DATA SUMMARY REPORT – BUILDING 123 IHSS – CLG-002-98

PURPOSE:

The purpose of this correspondence is to transmit the Final Pre-Remedial Investigation Report of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123 (Enclosed).

DISCUSSION

The report was generated as a result of the demolition of Building 123 and the requirement to characterize the soild around and beneath the bukIding concrete foundation/slab. The data within the report is intended to be utilized by Environmental Restoration to support the under building contamination scoring and subsequent ranking of the site.

RESPONSE REQUIREMENTS

None required. Should you have any questions regarding the report or the data included, please contact me at X7419 or Matt Dessi at X7640.

rcg

Enclosure:
As Stated

cc:
A. Primrose - w/1 copy
K. Dorr - w/2 copies
D. Hoyt - w/1 copy

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-98-255.UN

Final Pre-Remedial Investigation of Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123 Data Summary Report

Rocky Mountain Remediation Services, L.L.C.

REVISION 0

SEPTEMBER 1998

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS iii

1.0 INTRODUCTION 1

1.1 BACKGROUND 1

1.2 PRIOR INVESTIGATIONS 1

1.2.1 Resource Conservation and Recovery Act (RCRA) Unit 40 6
1.2.2 Potential Areas of Contamination (PACs) 6

1.3 GEOLOGY 8

2.0 RECENT INVESTIGATION 8

2.1 PLANNED INVESTIGATION 8

2.2 IMPLEMENTED INVESTIGATION 11

2.3 INVESTIGATION RESULTS 12

2.4 SAMPLING/FIELD SUMMARY 13

3.0 QUALITY ASSURANCE/DATA USABILITY 17

3.1 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, AND COMPARABILITY (PARCC) 18

3.1.1 Precision 18
3.1.2 Accuracy 19
3.1.3 Representativeness 20
3.1.4 Completeness 20
3.1.5 Comparability 20

3.2 EQUIPMENT RINSATE BLANK EVALUATION 21

4.0 CONCLUSION 23

5.0 RESULTS 23

6.0 REFERENCES 27

TABLES

1-2 Constituents Detected above Minimum Detection Levels or Activities in Soil Sample Collected during Surface Soil at IHSS 148 5
2-1 Sampling Requirements 9
3-1 Building 123 Subsurface Soils - Overall Precision Compliance Results 19
3-2 Building 123 Subsurface Soils - Analytical Detection Limits 20
3-3 Comparison of Borings Proposed and Borings Completed 21

TABLES (continued)

3-4 Equipment Rinsate Sample Results 22
5-1 Radionuclides - Maximum Activities Detected 23
5-2 Volatile Organic Compounds - Maximum Concentration 24
5-3 Semi-Volatile Organic Compounds - Maximum Concentration Detected 25
5-4 Metals - Maximum Concentration Detected 26
5-5 Nitrates-Maximum Concentration Detected 26

FIGURES

1-1 Building 123 Site Location 2
2-1 Planned Soil Sampling Locations 10

APPENDICES

Appendix A — Building 123 Subsurface Soils Radionuclide Results A-1
Appendix B — Building 123 Subsurface Soils - VOC Results B-1
Appendix C — Building 123 Subsurface Soils - Semi-VOC Results C-1
Appendix D — Building 123 Subsurface Soils - Metals Results D-1
Appendix E — Building 123 Subsurface Soils - Nitrate Results E-1
Appendix F— Building 123 Actual Sample Location Survey Elevation Points F-1
Appendix G— Radionuclide Precision Evaluation Results G-1
Appendix H— Volatile and Semi Volatile Organics Precision Evaluation Results H-1

ATTACHMENTS

Attachment 1— Actual Soil Sampling Locations/Borehole Map
Attachment 2— Common Data Qualifiers

ACRONYMS

ALF	Action Level Framework
Am	Americium
Be	Beryllium
BTEX	Benzene, toluene, ethylbenezene, and xylene
$C_{2\partial}H_4O_2$	Acetic acid
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Resource, Compensation, and Liability Act
Cm	Curium
DNAPL	Dense Non-aqueous Phase Liquid
DOE	Department of Energy
EMD	Environmental Management Department
ER	Environmental Restoration
FIDLER	Field Instrument for the Detection of Low Energy Radiation
GC/MS	Gas Chromatography/Mass Spectrometry
GPR	Ground Penetrating Surveys
GPS	Global Positioning System
H_2SO_4	Sulfuric acid
HCI	Hydrochloric acid
$HClO_4$	Perchloric acid
HF	Hydrofluoric acid
HNO_3	Nitric acid
HPGe	High Purity Germanium
HRR	Historical Release Report
IHSS	Individual Hazardous Substance Sites
LNAPL	Light Non-aqueous Phase Liquid
mg/kg	milligram per kilogram
NaOH	Sodium Hydroxide
NAPL	Non-aqueous Phase Liquid
NH_4OH	Ammonium hydroxide
OPWLs	Original Process Waste Lines
OU	Operable Unit
PACs	Potential Areas of Contamination
PAM	Proposed Action Memorandum
PCB	Polychlorinated Biphenyls
pCi/g	picocuries per gram
pCi/l	picocuries per liter
PCE	Tetrachloroethene
PID	Photo ionization detector
PPM	parts per million
Pu	Plutonium
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RWP	Radiological Work Package
TCFM	Trichlorofluoromethane
U	Uranium
UBC	Under Building Contamination
ug/Kg	microgram per kilogram
ug/l	microgram per liter
VOA	Volatile organic analysis
VOCs	Volatile Organic Compounds

FINAL PRE-REMEDIAL INVESTIGATION OF IHSS 121 AND 148 DATA SUMMARY REPORT

1.0 INTRODUCTION

A pre-remedial field investigation was conducted in June and July 1998 to identify and delineate the extent of the Under Building Contamination (UBC) from Individual Hazardous Substance Sites (IHSS) 121 and 148 and to further characterize these IHSS. The purpose of the sampling was to characterize the presence or absence of hazardous and/or radioactive contamination in the soil beneath the Building 123 concrete slab, leaks adjacent to selected sumps, process waste lines and pits, localized spills and the general condition of the surrounding grounds. The goal of the field investigation was to determine the presence of contamination in the soil to support the decontamination and demolition of Building 123 and fulfill criteria defined by the *Proposed Action Memorandum (PAM) for the Decommissioning of Building 123* (RMRS 1997a). The data will be used to score under building contamination at Building 123 relative to RFCA soil action levels. This score will be subsequently ranked by Environmental Restoration (ER Ranking) in relation to other sites at RFETS for remediation decisions.

1.1 BACKGROUND

Building 123 is located on Central Avenue between Third and Fourth Streets at the RFETS, (Figure 1-1). The Building 123 area encompasses overlapping IHSS 121 and 148 and a portion of RCRA Unit 40 (Figure 1-2).

Four (4) associated Potential Areas of Contamination (PACs), 100-601, 100-602, 100-603, and 100-611 have been identified in the RFETS *Historical Release Report* (HRR, DOE 1992c). The PACs were established as the result of documented spill incidents.

Unconfirmed reports of contaminant spills have been indicated in interviews with building employees. In the late 1960's or early 1970's a cesium-contaminated liquid was spilled on the concrete floor in Room 109C (Figure 1-2). The floor was immediately sealed to immobilize the contamination. No further action was initiated to address consequences of the spill.

1.2 PRIOR INVESTIGATIONS

IHSS 121 consists of RCRA Unit 40 underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3, which were designated in the *Final Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan For Operable Unit 9* (DOE 1992a). The area has also been identified as PAC 000-121 in the HRR. The OPWL system constitutes former Operable Unit No. 9 (OU 9) and RCRA Unit 40, the plant-wide process waste system comprised of tank and underground pipelines constructed to transport and temporarily store process wastes from point of origin to on-site treatment and discharge points.

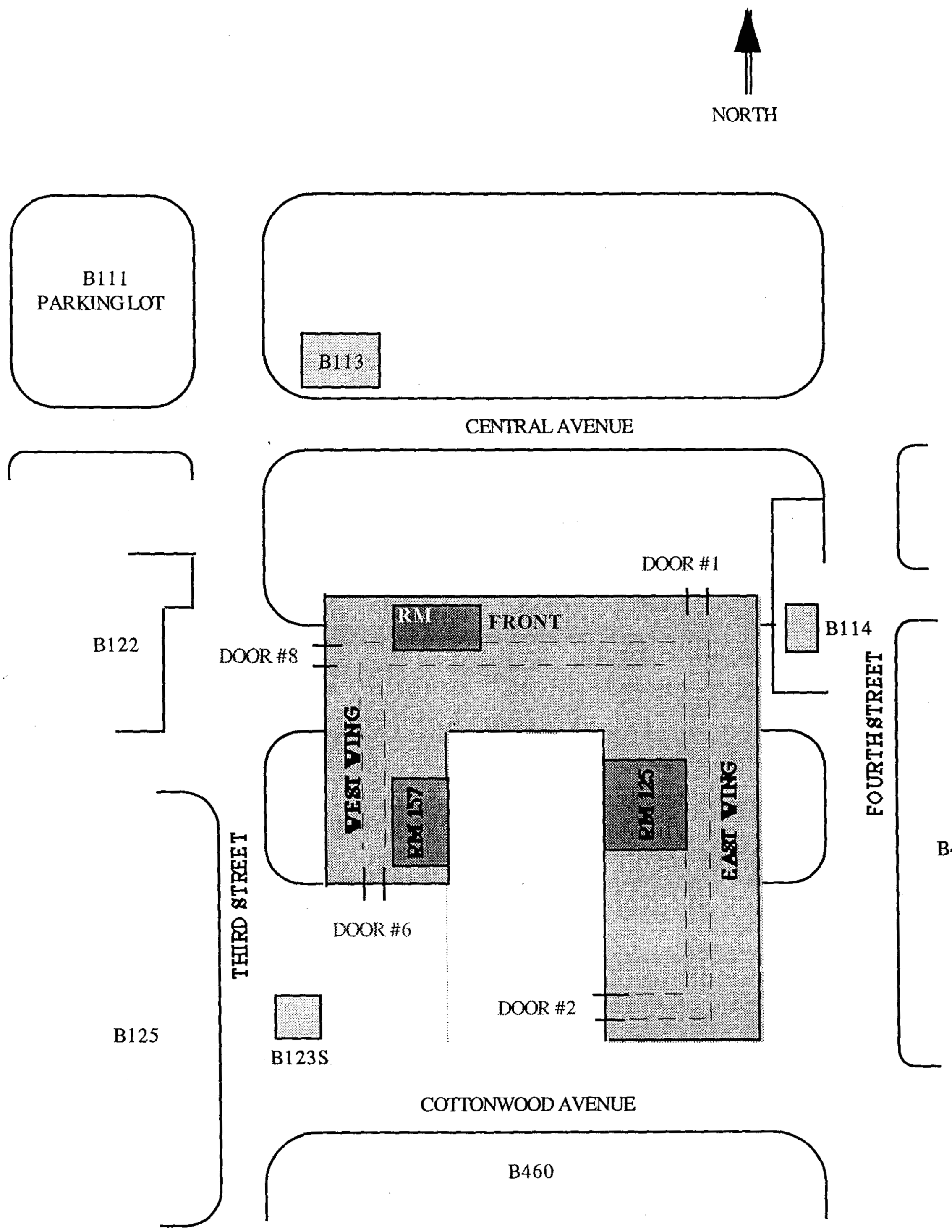

Figure 1-1 Building 123 Site Location

All process waste generated from 1952 to 1968 was transferred from Building 123 to Building 441 through Line P-2, which ran below the west side of the east wing before exiting at the southeast corner of the building. In 1968, the east wing was extended about fifty (50) feet to the south. Prior to the building addition, two manholes (MH-2 and MH-3, Figure 1-2) were constructed and the line was extended south to MH-2, then east to MH-3, and North to MH-4, before assuming the original path at P-2. The extension was designated as P-3. One manhole was abandoned and covered by the building addition. In 1972, a west wing was constructed, extending south from the northwest corner of the original building. Prior to construction of the wing, Line P-1 was installed to transfer waste to Manhole MH-1, then east to a junction with P-3 at MH-2 (Figure 1-2). The lines transferred the following process waste from Building 123:

- Acids: nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid (Hydrochloric acid ($HClO_4$);
- Bases: ammonium hydroxide (NH_4OH) and sodium hydroxide (NaOH);
- Solvents: acetone, alcohols, cyclohexane, toluene, xylene, triisooctomine, and ether;
- Radionuclides: various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm);
- Metals: beryllium (Be) (trace amounts); and
- Others: ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs) (DOE 1992a).

In 1982, P-2 and P-3 were abandoned and plugged with cement. In 1989, the process waste transfer system was upgraded, including removal of the east-west section of P-1 between MH-2 and MH-3. The north-south section of P-1 between Building 123 and MH-1 was converted to the new process system. Three large, interconnected concrete sump pit areas were installed in Rooms 156, 157, and 158 to accommodate process waste system backup. Pipe was installed connecting MH-1 to Valve Vault 18. A second building addition was also made to the south end of the east wing, partially overlying Line P-3 (Figure 1-2).

Currently, all process waste throughout Building 123 is collected in floor sumps. Each sump collects and temporarily stores liquid waste which is then pumped through overhead lines into a main floor sump in Room 158. The waste is then gravity-fed through P-1 to Valve Vault 18, then to underground Tank T-2 (Tank 853) at Building 428, and finally to Building 374 for treatment (Figure 1-2).

A detailed characterization of former Operable Unit No. 13 (OU 13) was conducted from September 1993 to February 1995 as part of a Phase I RCRA RFI/RI. The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys. The investigation identified an area of reported small spills of nitrate-bearing wastes along the east side of Building 123 and a potential for soil contamination beneath the building due to possible leaks in OPWL P-2. The area was established as IHSS 148 and detailed in the *Final Phase I RFI/RI Work Plan for Operable Unit 13* (DOE 1992b). The area has also been identified as UBC 123 and PAC 100-148 in the HRR.

Thirty-four (34) analytes were detected in the surface soil survey, including twenty-six (26) inorganic compounds and eight (8) radionuclides. Eleven (11) analytes exceeded background limits at a minimum of one sample location throughout IHSS 148. Constituents that exceeded minimum detection levels or activities are indicated in Table 1-2.

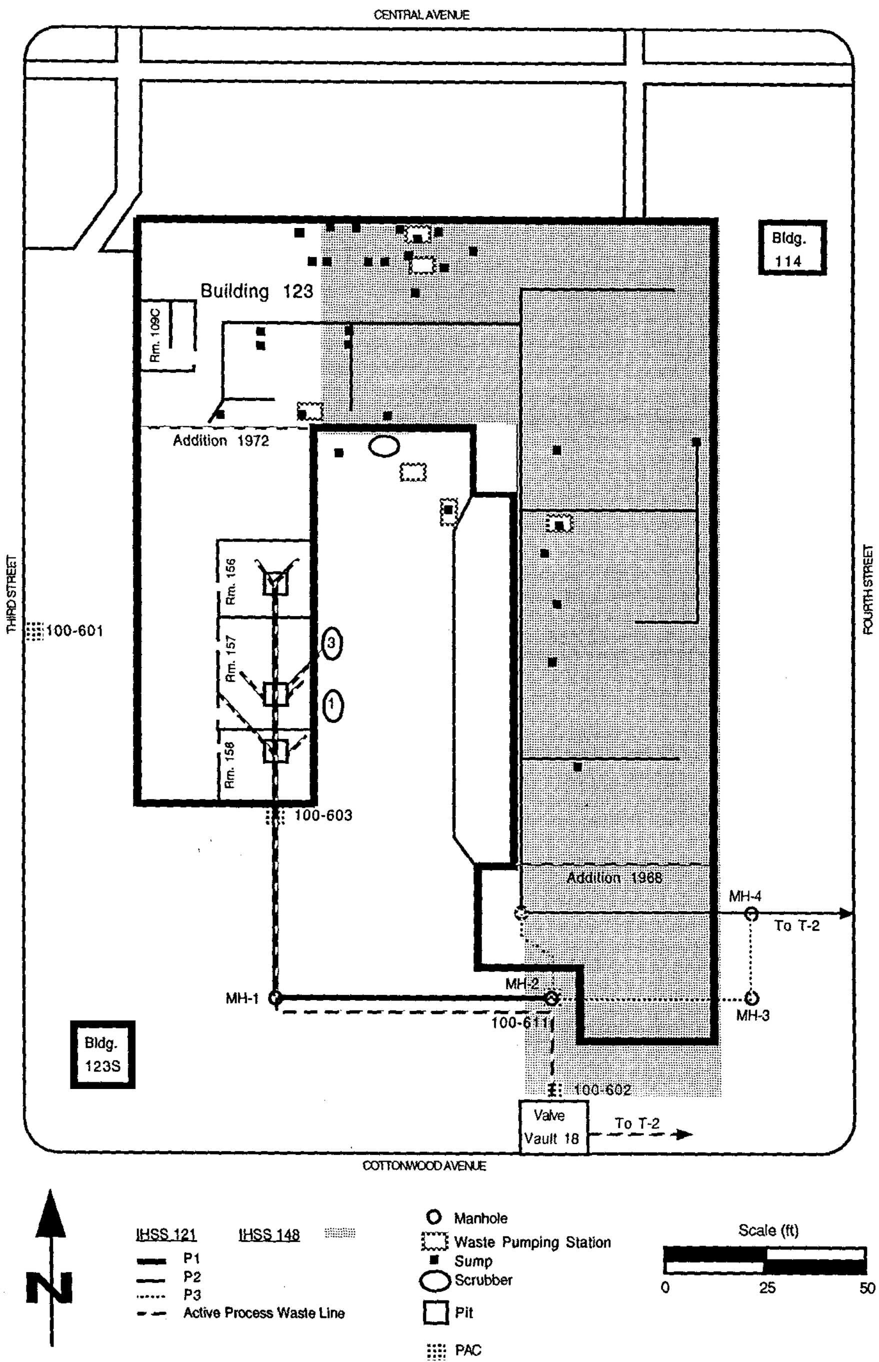

Figure 1-2 Building 123 and IHSS 121 and 148

Table 1-2 Constituents Detected above Minimum Detection Levels or Activities in Soil Samples Collected during Surface Soil Survey at IHSS 148

Constituents Detected Above Minimum Detection Levels or Activities	Maximum Concentration	Background Limits[a] 99/99 UTL[e]	Tier II Soil Action Levels[b]
Chromium	95.6 mg/kg [c]	22.21 mg/kg [c]	4860 mg/kg [d]
Cobalt	28.7 mg/kg	14.22 mg/kg	123,000 mg/kg
Copper	43.4 mg/kg	22.75 mg/kg	81,800 mg/kg
Lead	165 mg kg	73.87 mg/kg	1000 mg/kg
Nickel	52.4 mg/kg	19.74 mg/kg	40,900 mg/kg
Strontium	94.7 mg/kg	67.92 mg/kg	>1,000,000 mg/kg
Zinc	1,220 mg/kg	95.92 mg/kg	>1,000,000 mg/kg
Americium^{-241}	0.197 ± 0.032 pCi/g	0.037 pCi/g	38 pCi/g
Plutonium$^{-239/-240}$	0.169 ± 0.04 pCi/g	0.084 pCi/g	252 pCi/g
Uranium$^{-233/-234}$	2.04 ± 0.396 pCi/g	3.31 pCi/g	307 pCi/g
Uranium^{-238}	2.14 ± 0.309 pCi/g	2.83 pCi/g	103 pCi/g

[a] Source: DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program,* May.
[b] Source: DOE 1996, *Final Rocky Flats Cleanup Agreement*, July. Metal analyte action levels are based on office worker exposure to soil; radionuclide action levels are based on annual dose limits.
[c] Result indicates total chromium (chromium III + chromium VI).
[d] Result indicates chromium VI only. Action level for chromium III is >1,000,000 mg/kg.
All UTLs calculated assuming a normal distribution.

The soil-gas survey was conducted on a 25-foot grid in accordance with the 0413 RFI/RF (DOE 1992b) work plan. Samples were analyzed in the field using Gas Chromatography/Mass Spectrometry (GC/MS). Sixty-four (64) soil-gas locations were sampled during the survey. Thirteen (13) samples contained volatile organic compound (VOC) levels in excess of the one µg/ L method detection limit. Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the east and west wings of the building. Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2.6 µg/ L. Tetrachloroethene (PCE) was detected at 1.5 µg/ L in a sample collected to the east of Building 123. The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate. Analyses results indicate that subsurface infiltration precluded full evaporation.

1.2.1 Resource Conservation and Recovery Act (RCRA) Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, which includes all active overhead and underground and process waste lines in and around Building 123. No other RCRA unit exists within the Building 123 area. A plan for partial closure of RCRA Unit 40 will be written to characterize and manage all active OPWLs associated with Building 123, as all abandoned lines were properly decommissioned prior to implementation of RCRA regulations.

1.2.2 Potential Areas of Contamination (PACs)

PACs 100-601, 100-602, 100-603, and 100-611 were identified in the HRR, and involve potential impact to the soils surrounding Building 123. All of the four (4) PACs are located in Figure 1-2. The following outlines the nature of each PAC by describing the occurrence, constituents released, and response to the occurrence.

PAC 100-601, Phosphoric Acid Spill

On April 13, 1989, two five-gallon plastic containers of phosphoric acid, which were among other containers of waste chemicals awaiting disposal in a storage cabinet outside of Building 123, deteriorated and leaked a portion of the contents onto the paved ground surface. Approximately one gallon of 1, 2 ethylhexyl phosphoric acid leaked from the containers. At the time the release was detected, approximately eight ounces of the liquid were present on the ground within the vicinity of the cabinet. The spill was contained and the remaining liquid was properly disposed. No further action was required to address consequences of the spill.

PAC 100-602, Process Waste Line Break

On April 13, 1989, Valve Vault 17, located on Cottonwood Avenue between Building 443 and 444, was found to be flooded with approximately 1,200 gallons of aqueous waste. Subsequent investigation indicated that the source of the waste was a break in the active portion of P-1 in Manhole MH-1 (Figure 1-2). Leakage from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (i.e., soils) or a PVC electrical conduit. The release also migrated into a section of the OPWL network. Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, five days after the initial detection of release at Valve Vault 17. The potentially affected area includes the active process waste line between MH-2 and Valve Vault 18; the process waste line between Valve Vault 18 and Valve Vault 17, soils surrounding Valve Vault 18 and Valve Vault 17, and OPWL P-3 between MH-2 and MH-3. In July 1989, groundwater containing blue dye used several months earlier to trace the release was observed seeping into excavations around Valve Vault 18.

The release consisted of Building 123 process waste. An estimate was made of types and quantities of materials released to the environment during the five-day period between detection of the release and diversion of Building 123 wastes from the broken line. The estimate was based on typical daily quantities of wastes discharged from Building 123. The wastes listed below would have been diluted in approximately 2,000 gallons of tap water:

- 25 gallons urine;
- 12.5 gallons nitric acid (concentration unknown);
- 20 gallons hydrochloric acid (concentration unknown);
- 1.5 lbs. ammonium thiocyanate;
- 1.0 lbs. ammonium iodide; and

- 2.5 lbs. ammonium hydroxide (concentration unknown).

Minor amounts of naturally-occurring uranium were detected in soil and water samples collected after the release. Alpha activity up to 140 pCi/L was recorded in samples of the waste from Valve Vault 17. One water sample from MH-2 also contained eight percent ethylene glycol. Soil sampling was conducted to determine the source and extent of the release (See Section 1.2.2). A temporary surface line was installed, and a replacement underground line was installed in 1989 as part of the process line upgrades. Since the affected areas were located near existing IHSS scheduled for investigation and remediation activities, no cleanup was initiated. Water and soil samples collected for several weeks after the release indicated that contamination levels (nitrates, chlorides and pH) decreased steadily after the broken line was bypassed.

PAC 100-603, Bioassay Waste Spill

On June 9, 1989, OPWL P-1 was under excavation and replacement due to a break in the line (PAC 100-602). The excavated end of the broken line was temporarily capped with a plastic bag, and Building 123 process waste was rerouted to bypass the broken line. A pump used to reroute the waste failed and allowed the waste to overflow into the broken line. A portion of the waste leaked around the plastic bag and into the excavation. The release was confined to the excavation.

The release consisted of bioassay waste containing hydrochloric acid and nitric acid. The waste exhibited a pH of approximately one. The waste may also have contained urine, and up to a combined total of 1.5 gallons of ammonium thiocyanate, ammonium iodide and ammonium hydroxide. The estimated maximum volume of the spill was 30 gallons. The released material commingled with rainwater in the excavation.

Potential flow from the excavation was contained with earthen berms. Approximately 100 gallons of rainwater contaminated by the spill were neutralized, pumped from the excavation, and transferred to the process system for treatment in Building 374. Samples were collected to evaluate the spread of contamination. Results indicated that contamination was restricted to the excavation within eight feet of Building 123. No further action has been initiated.

PAC 100-611, Building 123 Scrubber Solution Spill

On November 7, 1989, an inoperative pump in the Building 123 process waste transfer system caused the Building 123 Scrubbers 1 and 3 to overflow, spill scrubbing solution into a bermed area outside of the building and into three sump pits in Rooms 156, 157, and 158 (Figure 1-2). All of this solution was contained within secondary containment structures, and none of the solution was believed to have impacted the environment. The pits were pumped out and the concrete liners properly sealed. The transfer pump failure was determined to be the result of blockage caused by glass filtering wool.

The scrubbing solution consisted primarily of water and was used to scrub acids and salts used in Building 123. Approximately 50 gallons were released to the bermed area, and several hundred gallons were contained in the three sump pits. Analysis indicated that the solution contained in the bermed area exhibited a pH of 1.6; the solution in the three pits indicated a pH of 6.0. All spilled materials were contained and transferred into the Building 123 process waste transfer for eventual treatment at Building 374.

1.3 GEOLOGY

The local geologic setting includes an industrial area that has been gradually developed. The natural soils have been disturbed and replaced by fill during installation of the OPWLs and covered by pavement and structures including Building 123. The soils, fill, pavement, and structures are underlain by Rocky Flats Alluvium which averages about 38 feet in thickness and is composed of poorly to moderately sorted clay, silt, sand, and gravel. The Cretaceous Arapahoe Formation underlies the superficial material and is mainly claystone and silty claystone with sandstone bodies present. Groundwater exists below the site at a depth of approximately 12-17 feet and flows in a generally eastward direction.

2.0 RECENT INVESTIGATION

Historical information detailed in Section 1.2 provided general indications of the types of compounds anticipated at each IHSS, and was used to develop a systematic sampling strategy for this investigation. The sampling rationale was based on historical data. Sample points were selected at biased locations and randomly at other areas. Preliminary sampling was restricted to soils underlying and surrounding Building 123.

The following conditions were considered in the development of the sampling strategy:

- The operating history of Building 123 suggests that contaminants may have been released into the environment;
- The physical and chemical properties of the contaminants suggest a chronic presence if released into the environment; and
- Historical data indicated the presence of contaminants in quantities above the maximum background concentrations defined by Site Procedure 4-U50-REP-1006, *Radiological Characterization of Bulk or Volume Materials* and the *Background Geochemical Characterization Report* (DOE 1993).

The conceptual models of contaminant migration involve percolation downward through the vadose zone (generally less than 10 feet thick) to the water table. The groundwater flow in this area is predominantly to the northeast. Contaminants may volatilize or biodegrade before reaching the shallowest groundwater zone. Contaminant concentrations are also reduced by dispersion during migration through the porous Rocky Flats Alluvium. Paved portions of the Building 123 area provide an additional impedance to contaminant migration, as precipitation is diverted to the storm water drainage system instead of percolating through the ground surface (DOE 1992b).

2.1 PLANNED INVESTIGATION

The sampling event focused on the soils underlying and surrounding Building 123 as indicated in Table 2-1. Subsurface soils were proposed to be sampled to a total depth of six (6) feet as described in Section 2.3 as historical data indicated that the presence of contaminants below this depth is unlikely (DOE 1992b).

Forty-eight (48) locations were planned (Figure 2-1) in the area of the Building 123 slab: six (6) were to be collected immediately beneath the building slab at a depth of approximately one foot; twenty (20) were to be located underneath the building slab at a depth of approximately six feet; and twenty-two (22) were to be located in areas surrounding Building). Locations were determined with respect to underground OPWLs and paved and unpaved areas. The investigation focused on the following areas:

- Unpaved areas along the east side of Building 123, to further characterize potential areas of volatile organic constituent contamination;
- Underground OPWLs beneath and to the south of Building 123;
- Points at which the overhead waste process lines enter the subsurface at the south end of the west wing of Building 123;
- PACs; and
- Locations of process waste sumps, waste pumping stations, and OPWL junctions and elbows.

Random samples were to be used to characterize the remainder of the Building 123 area. West side) According to *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area* (DOE 1992) and personnel interviews, no contaminant spills or leaks have been reported in these areas, therefore, boreholes were to be drilled at 50 foot intervals along the west boundary of the building.

Table 2-1 Sampling Requirements

Area of Concern	Reason	# of Samples	Depth/Interval
Unpaved Areas	Potential VOC contamination	3	6 feet
OPWLs	Potential contamination	14	6 feet
Underground Process waste lines	Potential contamination	3	1 foot
PACs	Potential contamination	3	6 feet
Sumps, pump stations, junctions, elbows	Potential contamination	10 3	6 feet 1 foot
Random sampling (west side)	Potential contamination	10	6 feet

Sampling was planned at each location, which consisted of one VOC grab sample and the remaining samples were a composite of the entire core. Figure 2-1 indicates total planned depths of each core. Locations outside of Building 123 were planned to be sampled to a total depth of six (6) feet. Locations within the Building 123 perimeter near waste pumping stations, sumps, and junctions were planned to be sampled to a depth of six (6) feet, as building as-built drawings indicated that the pipelines exist at a maximum depth of five (5) feet, and leaks associated with underground lines characteristically migrate downward. All remaining locations were planned to be sampled immediately beneath the building slab (approximately one foot below slab surface) in areas near sumps and sites of historical spills to address potential migration of the process wastes through concrete.

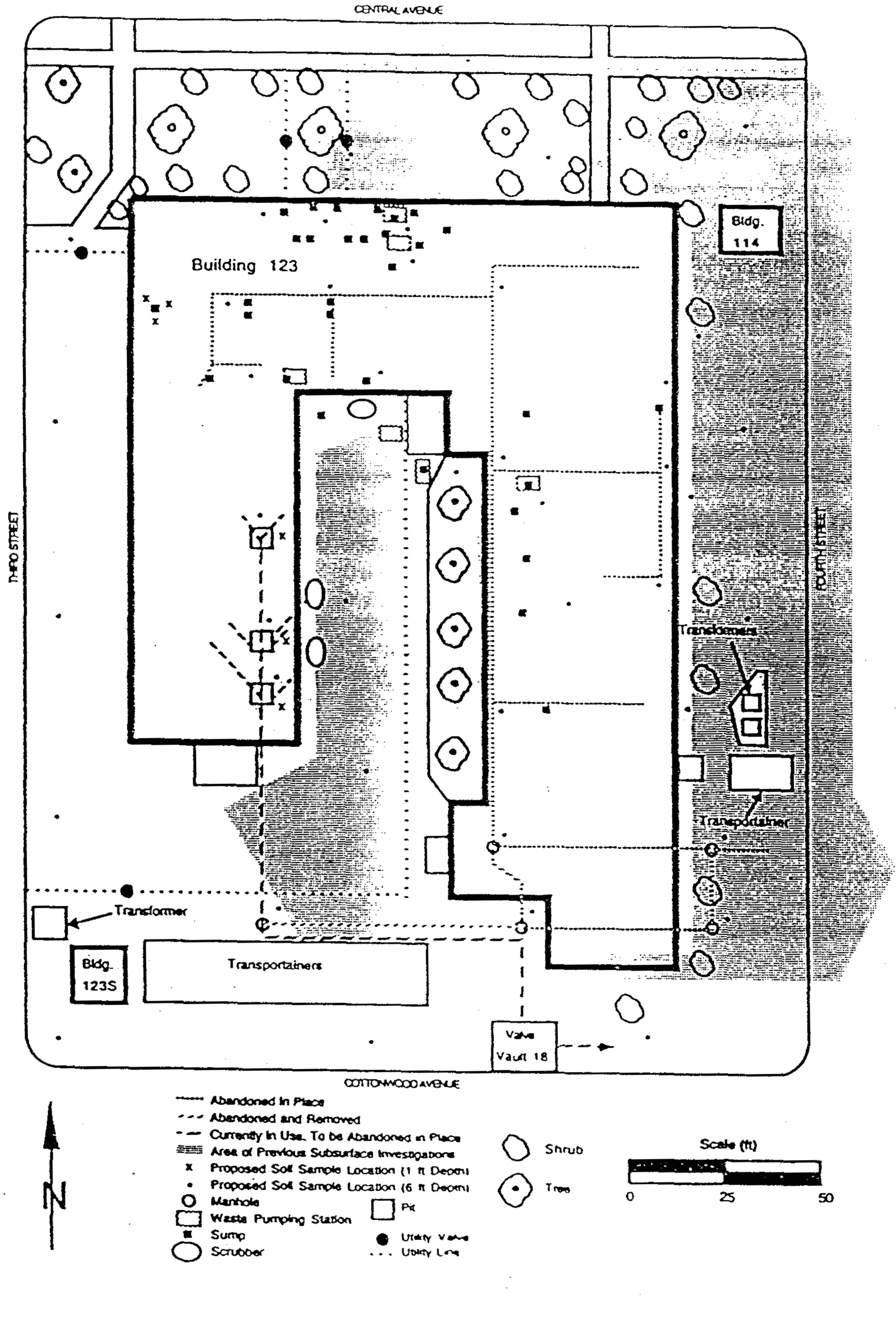

Figure 2-1 Planned Soil Sampling Locations

Sample depths were planned to be reached using a Geoprobe® truck-mounted hydraulic ram in accordance with Site Procedure 5-21000-ER-OPS-GT.39, *Push Subsurface Soil Sampling.* Soil cores were to be recovered continuously in two-foot increments using a 1-inch diameter by 24-inch long stainless steel-lined California core barrel. Recovered soil was to be placed into a stainless steel bucket until the desired depthwas reached, at which time the soil was to be composited by hand using a stainless steel trowel. VOC samples were to be collected as grab samples and not composited. Cores were planned to be monitored in the field with a Flame Ionization Detector (FID) or a Photoionization Detector (PID) in accordance with Site Procedure 5-21000-OPS-FO.15, *Photoionization Detectors and Flame Ionization Detectors* for health and safety purposes.

Locations beneath the building slab were planned to be sampled by coring through the slab with a hand-held, rotary-type concrete corer to access the underlying soils. The procedures used for coring are outlined in RF/RMRS-97-125.UN, *Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab.* This plan was modified to describe sampling through the slab prior to sampling activities taking place. Resulting holes were to be properly back-filled with granular bentonite.

A Radiological Control Technician (RCT) was to scan each sample with a Field Instrument for the Detection of Low Energy Radiation (FIDLER). Equipment was to be monitored for radiological contamination during sampling activities. All sampling equipment was planned to be decontaminated with an liquinox solution, and rinsed with deionized water, in accordance with Environmental Management Department (EMD) Operating Procedure 5-21000-OPS-FO.03, *General Equipment Decontamination, Section 5.3.1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field.* All other sampling equipment was to include standard items such as chain of custody seals and forms, logbooks, etc. The cores were planned to be visibly inspected for signs of contaminant staining, then visually logged by the field geologist as per Site Procedure 5-21000-ER-OPS-GT.01, *Logging Alluvial and Bedrock Material*. Additional samples were to be collected if cores exhibited visible evidence (staining, odors, etc.) of contamination at shallower depths.

Three (3) field duplicates were to be collected to represent at least 5% of the sample batch to provide adequate information on sample variability, as defined in *Guidance for Data Quality Objectives Process* (EPA 1994).

Sample points were planned to be surveyed for location and elevation using geometric/location survey equipment to ensure accuracy in data plotting (Appendix E).

2.2 IMPLEMENTED INVESTIGATION

Of the forty-eight soil sampling locations planned, thirty-four could not be drilled where initially located due to conflicts with utilities, process waste lines and offsets due to refusal (insubstantial retrieval, i.e. voids and rocks). However, the revised sample locations were adequate to conduct the investigation, and viable information was obtained. Fourteen planned locations (9, 10, 11, 14, 15, 16, 17, 24-2, 25-3, 37-15, 38-16, 39-17, 41-19 and 47-25) were relocated to keep RFETS procedure (1-B37-HSP-12.08), which states a ten foot minimum distance kept between excavation work (sampling in this case) and process waste lines and/or utilities. Twenty planned locations (4, 5, 7, 8, 11, 12, 14, 16, 17, 18, 20, 23-1, 27-5, 29-7, 30-8, 31-9, 33-11, 35-13, 42-20 and 43-21) were offset to obtain adequate soils for analysis. Of these thirty-four locations, four locations (11, 14, 16 and 17), were first relocated due to utilities and then offset due to inadequate retrieval.

Six locations (23-1, 24-2, 27-5, 29-7, 30-8 and 31-9) were initially planned to core at a total depth of one foot, but an adequate sample could not be obtained and depth was increased to six feet. Of these six locations, three planned locations situated around a cesium well in former Room 109B could not be drilled due to voids under the building slab in excess of six feet. However, the revised locations (29-7, 30-8 and 31-9), were positioned as close to the planned locations per GPR (ground penetrating radar) surveys. This enabled adequate sample to be retrieved within the proposed vicinity.

One planned Location 42-20, revealed elevated fixed alpha readings at 780 dpm after the concrete core was pulled from the concrete slab to access underlying soils. An offset was performed due to refusal at two feet and revealed elevated fixed alpha readings at 240 dpm. Neither of the elevated readings exceeded suspension guidelines on the radiological work permit (RWP), geoprobing proceeded, adequate soils were obtained and it was determined after the alpha decayed (less than 48 hours) that a radon pocket was the cause of elevated readings. For all locations, original or offset, no elevated VOC (volatile organic compounds) were observed with a PID (photo ionization detector).

2.3 INVESTIGATION RESULTS

Each sample location was split into two continuous cores (first core: from ground surface to two feet below ground surface, second core: from two feet below ground surface to six feet below ground surface), and the cores were visually inspected and logged. Total depth at each location did not exceed six feet. For each coring location, the first two feet of soils were utilized to obtain a VOA (volatile organic analysis) sample. The unused portion of the sample was then placed into a stainless steel bowl. The second/final sample-core (from two feet below ground surface to six feet below ground surface) was composited into the stainless steel bowl and utilized for the remaining parameters (i.e., isotopics, gross alpha/gross beta).

Core recovery varied for each sample location due to the nature of the fill material and alluvium. Alluvial deposits and fill material consisted of sandy-silty clays, gravely to sandy clay with occasional iron stained sands and clays mixed within samples. The similar properties between the fill material and alluvium made interpretation between the two difficult. Asphalt fragments, sandstone pebbles, gravel lenses and rock fragments were noted for Locations 1, 3, 4, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, and 21. (Note: for the previously mentioned locations, pre-drilling and/or coring through asphalt was required and the asphalt was removed out of the sample prior to compositing samples for analysis). Sandstone pebbles, gravel lenses, and fragments were noted in the fill material throughout the investigation area. Much of the core that was not recovered was probably loose, course material which tends to fall out of core barrels. Offsets were often a result of pushing a large rock greater than three inches in diameter and/or hitting refusal so that the core could not be pushed into the soils. When this occurred, locations were moved until substantial recovery could be utilized for analysis (i.e., twenty locations from Section 2.2).

While coring the fill material, loose material often sloughed into the borehole between core runs. Usually this material was easy to identify due to its disrupted appearance. Loose gravel present in disrupted clays could also be in-place and required careful examination of the core. After the core was examined and logged in the field, samples were composited and utilized for analysis.

Bedrock and groundwater (located on average at a depth of 10-15 feet) were not encountered throughout the investigation area due to the maximum coring depth of six feet.

2.4 FIELD SAMPLING SUMMARY

Following is a description of the investigation and summary for each soil sampling location according to the drilling sequence. A map of the actual soil sampling locations/boreholes can be found in Attachment 1. At Location 1, the first core (from ground surface to four feet below) consisted of a one (1) inch coring barrel. It was determined at this location that the remaining locations would be sampled using a three (3) inch macro-coring barrel to obtain maximum retrieval and efficiency. Soils for Location 1 were light brown in color, sandy-silty clays with sandstone pebbles and rock fragments. Some iron staining clays were present. There were no elevated readings detected with an electra and/or PID. A total depth of 5.8 feet was cored.

Locations 2 and 3 were similar in description. Soils were predominantly light brown in color, containing sandy-silty clays with sandstone pebbles and rock fragments. Some light gray and yellowish staining within the samples did exist. There were no odors and no elevated readings with an electra and/or PID. A total depth of 6 feet was cored for Locations 2 and 3.

At Location 4, an offset had to be performed due to refusal at 4 feet (large rock). The offset was placed 1 foot east of the planned location. Adequate sample was retrieved and the coring was completed. Soils were light brown, sandy-silty clays with sandstone pebbles and rock fragments. There were no odors and no elevated readings with electra and/or PID. A total depth of 6 feet was cored at the offset.

At Location 5, refusal was hit at approximately five feet. An offset was utilized one foot north of the planned location and re-coring was completed. Soils were light brown, sandy-silty clays with sandstone pebbles and rock fragments. There were no odors, no staining and no elevated readings detected with an electra and/or PID. A total depth of six feet was cored at the offset.

Location 6 consisted of light brown sandy-silty clays with sandstone pebbles and rock fragments. Some iron staining sands and clays were mixed within the sample. There were no odors and no elevated readings with an electra and/or PID. A maximum depth of 5.8 feet was cored for this location.

At Location 7, coring was completed at the planned location to a depth of six feet. When the soils were composited it was determined by the field geologist in conjunction with the sample team that inadequate soils were retrieved due to an abundant quantity of rock and fragments. An offset was performed one foot west of the planned location. Coring was completed and adequate sample was retrieved. Soils were light brown, sandy-silty clays with some sandstone pebbles and fragments. There were no odors, no staining and no elevated readings detected with an electra and/or PID. A total depth of six feet was cored at the offset.

At Location 8, a second offset was needed due to refusal (coarse material at two feet) at the planned location and the first offset (one foot west of the planned location). The second offset (two feet west of the planned location) was completed and adequate retrieval was obtained for analysis. The completed core contained light brown, sandy-silty clays with sandstone pebbles and rock fragments. There were no odors, no staining and no elevated readings with an electra and/or PID. A total depth of 5.7 feet was cored at the second offset.

Location 9 was moved approximately 12 feet north from its planned location due to underground utilities. The soils for this location were light brown, sandy-silty clays, some iron staining within the clays, sandstone pebbles, gravel lenses and fragments. There were no odors, no elevated readings with an electra and/or PID. A total depth of six feet was cored.

Location 10 was moved approximately 12 feet south from its planned location to keep RFETS 10 foot minimum distance from process waste lines. The moved location was adequate for coring and viable information was obtained. The soils were light brown, sandy-silty clays with sandstone pebbles and fragments. There were no odors, no staining and no elevated readings with an electra and/or PID. The total core depth was 5.2 feet below ground surface.

Location 11 first needed to be relocated to keep RFETS 10 foot minimum distance from process waste lines, then two offsets were needed due to refusal (coarse material at three feet) at the moved location and the first offset (one foot north of the planned location). The final offset (one foot south of the moved location) was completed and sufficient soils were collected for analysis. The soils at the final offset were light brown, sandy-silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no odors, no staining and no elevated readings with an electra and/or PID. A total coring depth of five feet was obtained for the final offset.

At Location 12, an offset was performed to obtain sufficient retrieval for analysis. Soils were light brown with gray staining, sandy-silty clays with pebbles and rock fragments. There were no odors and no elevated readings with an electra and/or PID. A total coring depth of 5.6 feet was completed.

Sample Location 13 (within the B123 courtyard) was positioned on top of a sand/gravel fill (approximately 1.5 feet in depth). The fill was situated on a bed of asphalt (8 inches thick). The geoprobe was pushed to asphalt and with a new coring barrel re-entered into the "pilot" hole and pushed through the asphalt. When the soil was retrieved, the asphalt was separated out of the sample prior to preparing the composite. The soils for Location 13 were light brown, sandy-silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no odors, no staining and no elevated readings with an electra and/or PID. The total coring depth was five feet before refusal was encountered.

Location 14 was first moved to keep RFETS 10 foot minimum distance from utilities, then an offset was performed a foot south of the moved location. At the moved location, refusal was reached at 4 feet below ground surface, but sufficient sample was obtained for analysis. Soils were light brown sandy-silty clays with sandstone pebbles, gravel lenses and fragments with iron stained clays mixed within. There were no odors present and no elevated readings with an electra and/or PID. Total coring depth was four feet.

Location 15 was first moved to keep RFETS 10 foot minimum distance from utilities and then cored. Sample consisted of soils that were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. No odors were present and no visible staining existed within the core. There were no elevated readings with an electra and/or PID. Total coring depth was 4.5 feet before refusal was encountered.

Location 16 was first moved from its planned location to keep RFETS 10 foot minimum distance from utilities and then an offset was required due to refusal at three feet. The offset was positioned one foot east of the moved location. Soils from the offset were light brown, sandy-silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no odors, no visible staining and no elevated readings with an electra and/or PID. Total core depth at the offset was five feet.

Location 17 was required to keep RFETS 10 foot minimum distance from utilities and two offsets were required to obtain sufficient sample. At the final offset, soils were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no odors, no apparent staining and no elevated readings with an electra and/or PID. Total core depth was 5.4 feet prior to encountering refusal.

Location 18 was completed after an offset was utilized. The soils were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no odors, no apparent staining and no elevated readings with an electra and/or PID. Total core depth was six feet.

At Location 19, soils were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or stains and no elevated readings with an electra and/or PID. The total coring depth was 5.7 feet.

Location 20 was moved approximately 25 feet south of its planned location due to refusal (concrete walkway) below the B123 courtyard fill material. Fill material at Location 20 was 1.5 feet on top of ground surface. The fill material was placed within the courtyard after demolition of the building to create one plane from east to west wings. Once ground surface was reached, a clean core barrel was positioned into the "pilot" hole and coring was completed. Soils were light brown in color, moist sandy-silty clays with sandstone pebbles, gravel lenses and rock fragments. Within the coring sample were decomposing organics (roots and grass from trees and lawn which existed prior to demolition and fill placement). There were no odors or staining and no elevated readings with an electra and/or PID. The total coring depth was six feet.

Similar to Location 20, Location 21 was cored after the fill material above ground surface was pre-drilled. The sample from Location 21 contained an abundance of gravel and rock fragment material. Adequate sample was obtained, but it was noted that a large amount of the core contained gravel. The soils within the core were light brown sandy silty clays with sandstone pebbles, gravel and rock fragments. There were no apparent odors or stains and no elevated readings with an electra and/or PID. Total coring depth was four feet.

At Location 22, soils were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth was six feet below ground surface.

The remaining sampling locations were situated on the Building 123 pad and concrete coring was necessary to access soils beneath the slab. Each concrete core was approximately eight inches in depth and three inches in diameter.

At Location 23-1, an offset was needed due to refusal at the planned location. The offset was positioned 1 foot east of the planned location. Soils at the offset were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth at the offset was 5.6 feet.

Locations 24-2, 25-3, 26-4 and 28-6 were all completed at the planned locations. Soils for the four locations were identical; light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth for each location was six feet.

At Location 27-5, a rock was pushed from one foot to three feet below ground surface. An offset was performed one foot east of the planned location. Soils from the offset were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth at the offset was five feet.

Locations 29-7, 30-8, and 31-9 were planned around a cesium well in former Room 109B. Due to voids in excess of 6 feet, the sampling points were relocated to access sufficient soils for analysis. These three locations were positioned adjacent to the cesium well, as close as possible to the planned locations. All three locations had similar soil descriptions: soils were light brown with some iron stained sandy silty clays, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth for each location was six feet.

Location 32-10 contained soils that were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth at the offset was five feet.

At Location 33-11, two offsets were performed. On the final offset (1.5 feet south of the planned location) adequate soils were obtained for analysis. Soils were light brown, moist clays with some iron stained sands, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth was six feet.

Location 34-12 contained light brown, moist clays with some iron stained sands, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth was 5.4 feet.

At Location 35-13, two offsets were performed due to voids at three to six feet at the planned location and first offset (two feet west of the planned location). The final offset was positioned three feet north and three feet west of the planned location. At the final offset, adequate soils were obtained for analysis. Soils were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth at the final offset was 5.10 feet.

Location 36-14 was sampled at the planned location. Soils were light brown, moist clays with some iron stained sands, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth was six feet.

Locations 37-15, 38-16 and 39-17 were relocated to keep RFETS 10 foot minimum distance from utilities and then cored. All three samples consisted of soils that were light brown with some iron stained sandy silty clays, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth for each location was six feet.

Locations 40-18 and 41-19 were similar in description, except Location 41-19 was relocated to keep RFETS 10 foot minimum distance from utilities. Soils for both locations consisted of soils that were light brown with some iron stained sandy silty clays, sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings with an electra and/or PID. Total coring depth for each location was six feet.

At Location 42-20, after the first two feet of soil was pulled from the ground, refusal was encountered. When the geoprobe was removed from the ground, the location was monitored and revealed fixed alpha readings detected at 780 dpm. The soils extracted, the geoprobe coring barrel and equipment did not have elevated readings contained within and/or on its surfaces. Soils were placed back into the hole and sampling was stopped per radiological operations instructions. It was discussed that the offset needed to complete this location would not be performed until the final day of sampling (three days later). When the offset was completed (located six inches north of the original location), it revealed elevated alpha readings at 240 dpm. Sampling continued until adequate sample was retrieved for analysis. When adequate soils were obtained for analysis, the alpha readings dropped down to background levels or below detection limit. The geoprobe equipment and composited soils in the stainless steel bowls did not have elevated readings on its surfaces. It was then determined that a radon pocket was the cause of the elevated readings. The soils utilized for analysis at the offset were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors and no elevated readings once samples were being prepared for jarring. Total depth at the offset was six feet.

The soil descriptions for Locations 43-21, 44-22, 45-23, 46-24, 47-25 and 48-26 were identical, although an offset was needed for 43-21 and Location 47-25 was moved to keep RFETS 10 foot minimum distance from utilities. Soils at these locations were light brown, sandy silty clays with sandstone pebbles, gravel lenses and rock fragments. There were no apparent odors or staining and no elevated readings with an electra and/or PID. Total coring depth at these locations were six feet.

3.0 QUALITY ASSURANCE/DATA USABILITY EVALUATION

This section provides the preliminary results of Environmental Restoration Management's Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for Usability in Final Reports*, hereafter referenced as the data usability procedure. The data usability procedure was implemented to determine the usability of analytical results generated from the subsuperficial soil sampling program implemented at Building 123. The analytical results will be used to score under building contamination at Building 123 relative to RFCA soil action levels. This score will be subsequently ranked (ER Ranking) in relation to other sites at the RFETS for remediation prioritization. The data evaluated by this procedure include subsurface soil samples analyzed for radionuclides, volatiles, and semi-volatiles that were collected in support of the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123*, Revision 1, May 1998.

This evaluation was conducted with preliminary analytical results available as of August 25, 1998, therefore a complete data set was not evaluated. Deviations in performing data usability procedure consist of performing the procedure on data provided to RMRS by K-H Analytical Services Division in facsimile preliminary hardcopy format. Therefore, these data were not acquired from the Soil Water Database (SWD) as required in the data usability procedure and these data were neither verified nor validated. In addition, the data usability procedure was initiated without a complete data set (i.e., preliminary results were not available from all samples collected), therefore, completeness, and comparability could not be evaluated at this time. Precision, accuracy, and representativeness were evaluated as part of the data usability evaluation.

3.1 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, AND COMPARABILITY (PARCC)

3.1.1 Precision

Precision is a quantitative measure of data quality that refers to the reproducibility or degree of agreement among replicate of duplicate measurements of a parameter. The closer the numerical values of the measurements are to each other, the lower the relative percent difference (RPD) and the greater the precision. The RPD for results of duplicate and replicate samples was tabulated according to matrix and analytical suites to compare for compliance with established DQOs.

Use of soil sample field duplicates was the primary method of evaluation for overall precision for the Building 123 under building characterization program. One field duplicate collected for each 20 real samples collected was the frequency requirement for the evaluation of precision. Forty-eight (48) real soil samples were collected in support of the Building 123 project (Attachment 1). Based on this number of samples, three duplicate samples were required to meet the duplicate sample collection frequency identified in the SAP. Three duplicate soil samples were collected from Locations BH-20, BH 30-8 and BH 40-18.

For radionuclide analyses, the normalized absolute difference between the real sample and field duplicate is evaluated to determine if the results differ significantly when compared to their respective total propagated uncertainty. If the normalized absolute difference is greater than 1.96, results are qualified as estimated. Appendix G provides the results of the precision evaluation on radiochemical analyses. All values were below the 1.96 threshold and are therefore not qualified.

Volatile and semi-volatile results were available from all three duplicate and associated real samples with the exception of volatile results at Location BH 20. The data quality objective for field duplicate samples for non-radionuclides is $\leq$40% RPD for soils. RPDs were calculated for analytes with results above their respective detection limits. Summary results are provided in Appendix H.

Overall, the RPDs of less than or equal to 40% for VOC samples were based on analytical data available at the time of this evaluation. Duplicate results for Borehole 20 were not available when performing this evaluation resulting in only 66% overall precision compliance for VOC analyses.

Duplicate and real sample results for two semi-VOA analyses were below the required detection limits for all analytes. RPDs could not be calculated for these two samples. However, qualitatively the sample results may be interpreted to represent precision. RPDs of 150% and 122% for Phenanthrene and Pyrene respectively were calculated from Semi-VOA results from samples collected at Borehole 20. These results appear to represent hetrogeneity of the sample material. These exceedences resulted in only two of three duplicate samples meeting RPD thresholds for a 66% overall precision compliance of Semi-VOA analyses. Table 3-1 presents the overall precision compliance of the sampling program.

Table 3-1 Building 123 Subsurface Soils - Overall Precision Compliance Results

Analyte	Media	Total # Real Samples Collected	Total # Duplicates Collected	Number of Duplicates within DER/RPD	Overall Precision Compliance
Am-241	Soil	48	3	3	100%
Curium-243/244	Soil	48	3	3	100%
Pu-239/240	Soil	48	3	3	100%
U-234/235	Soil	48	3	3	100%
U-235	Soil	48	3	3	100%
U-238	Soil	48	3	3	100%
Analysis					
VOCs[1]	Soils	48	3	2	66%
Semi-VOCs[2]	Soils	48	3	2	66%

1) VOC results were not available for Location BH 20 at the time of the evaluation.
2) Semi-VOC results were below the detection limit for two samples, and therefore RPDs were not calculated. Precision was qualitatively attained for these two samples.

3.1.2 Accuracy

SAP vs. Actual Method Detection Limit Evaluation

Accuracy is a quantitative measure of data quality that refers to the degree of difference between measured or calculated values and the true value of a parameter. The closer the measurement to the true value, the more accurate the measurement. The actual analytical method and detection limits were compared with the required analytical method detection limits for VOC, semi-VOCs, and Radiochemical methods. The results of the detection limit comparisons are provided in Table 3-2.

Radiochemical analytical methods were performed utilizing alpha spectroscopy methods as outlined in the K-H ASD Isotopic Determination by Alpha Spectrometry Module, RC01-B.3. VOCs were determined by SW-846 Method 8260A, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique. Semi-VOCs were determined by SW-846 Method 8270B, Semi-volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique. The TCLP target analyte list was selected for both the VOC and Semi-VOC analyses.

Table 3-2 Building 123 Subsurface Soils – Analytical Detection Limits

Analyte	Required Analytical Method[1] (RDL)	Actual Analytical Method	Required Detection Limit (pCi/g)	K-H ASD RDL	Actual Detection Limit (pCi/g)
^{241}Am	Alpha Spectrometry	K-H ASD Alpha Spec	Not Specified	0.3 pCi/g	0.3 pCi/g
$^{239/240}Pu$	Alpha Spectrometry	K-H ASD Alpha Spec	Not Specified	0.3 pCi/g	0.3 pCi/g
$^{233/234}U$	Alpha Spectrometry	K-H ASD Alpha Spec	Not Specified	1.0 pCi/g	1.0 pCi/g
^{235}U	Alpha Spectrometry	K-H ASD Alpha Spec	Not Specified	1.0 pCi/g	1.0 pCi/g
^{238}U	Alpha Spectrometry	K-H ASD Alpha Spec	Not Specified	1.0 pCi/g	1.0 pCi/g
Volatile Organic Compounds	EPA 8260A	EPA 8260A CLP List	Not Specified	5 ug/kg (most analytes)	5 ug/kg (most analytes)
Semi-volatile Organic Compounds	EPA 8270B	EPA 8270B CLP List	Not Specified	660 ug/kg (most analytes)	660 ug/kg (most analytes)

[1]Guidance Provided in Environmental Monitoring Support Laboratory (EMSSL)-LV 0539-17, Radiological and Chemical Analytical Procedures for Analysis of Environmental Samples, March 1979.

Actual detection limits for alpha spectroscopy, VOCs and Semi-VOCs performed are acceptable for these data's intended use of scoring the under building contamination in relation to RFCA soil action levels and subsequent site ranking.

3.1.3 Representativeness

Representativeness is a qualitative characteristic of data quality defined by the degree to which the data absolutely and exactly represent the characteristics of a population. Reproducibility is accomplished by obtaining an adequate number of samples from appropriate spatial locations within the medium of interest.

3.1.4 Completeness

Completeness is a qualitative measure of data quality expressed as a percentage of validated or acceptable data obtained from a measurement system. A completeness goal of 90% was set for the Building 123 SAP. Real samples and QC samples are to be reviewed for data usability and achievement of internal DQO usability goals. Completeness could not be evaluated on the Building 123 data because only a partial data set was available at the time the usability evaluation was conducted.

3.1.5 Comparability

Comparability is a qualitative measure defined by the confidence with which one data set can be compared to another. Comparability is to be attained through consistent use of industry standards (e.g. SW- 846) and standard operating procedures, both in the field and in the laboratories. Comparability could not be evaluated at this time because only a partial data set was available. However, based on analytical results at the time of this evaluation, specific analytical methods were maintained for each analysis.

The actual sample location depths were compared with those stated in the SAP and organized by area of concern. Deviations were identified and provided in Table 3-3 below. Justification for deviations are discussed and provided in Section 2.2.

Table 3-3 Comparison of Borings Proposed and Borings Completed

Area of Concern	Reason	Number of Borings Proposed	Depth	Number of Borings Completed	Depth	Deviation
Unpaved Areas	Potential VOC Contamination	3	0-6 feet	8	0-6 feet	+5 Borings
OPWLs	Potential Contamination	14	0-6 feet	16	0-6 feet	+2 Borings
Underground Process Waste Lines	Potential Contamination	3	0-1 foot	3	0-6 feet	Sampled collected from 0-6 feet
PACs	Potential Contamination	3	0-6 feet	2	0-6 feet	-1 Boring
Sumps, pump stations, junctions, elbows	Potential Contamination	10 3	0-6 feet 0-1 foot	13	0-6 feet	Sampled collected from 0-6 feet
Random Sampling (West Side)	Potential Contamination	10	6 feet	6	0-6 feet	-4 Borings

It should be noted that boreholes originally intended to characterize the OPWLs and Underground Process Waste Lines could not be completed within the pipeline trench due to conflict with Site Procedure 1-B37-HSP-12.08. This procedure required the relocation of the boring a minimum of 10 feet away from the pipeline and therefore sample results may not be representative of actual contaminant concentrations within the pipeline trench. It is assumed that the pipeline was constructed of bedding material, which has a higher permeability than natural soils at the site. Contaminants would preferentially migrate within the bedding material to low points or to the manhole excavation. Borings completed 10 feet away from the excavation may not encounter contamination originating from the pipeline.

3.2 EQUIPMENT RINSATE BLANK EVALUATION

Equipment rinsate samples associated with the real samples must also be evaluated to determine if accuracy was affected (biased toward false positives) by cross-contamination during sampling or shipment. Results for alpha spectrometry, volatile and semi-volatile organic compounds from three equipment blanks (RINs: 98A5067, 98A5178, and 98A5145) were available at the time of this evaluation.

Radionuclide Equipment Rinsate Blank Results – Results for all three rinsate blank samples indicated that 241Am, 239/240Pu, 233/234U, 235U, 238U, and 238U were all below their respective RDLs. Qualifiers were not available for these data at the time of this evaluation. Therefore, at this time, it appears no radionuclides were detected in rinsate samples.

VOC Equipment Rinsate Blank Results – Acetone was detected at 7.23 ug/L in the equipment rinsate sample collected for RIN 98A5178. Acetone is a common laboratory contaminant. The EPA states that positive sample results should be reported unless the concentration of the compound in the sample is less than or equal to 10 times (10x) the amount in any blank for the common volatile laboratory contaminants (methylene chloride, acetone, and 2-butonone), or five times (5x) the amount of other volatile compounds. Based on this guidance, sample results for acetone in RIN 98A5178 less than 72.3 ug/l may be qualified by elevating the quantitation limit to the concentration found in the sample. Samples analyzed for acetone under other RINs exceed acetone results in RIN 98A5178 and would be used to score the Site. However, raising the quantitation limit for acetone results in RIN 98A5178 would have no effect on the outcome of the scoring, and therefore was not conducted. All results were treated as detects.

Semi-VOC Equipment Rinsate Blank Results - Phenol, Diethylphalate, Di-n-butylphthalate, bis (2-Ethylhexyl) phthalate were detected in equipment blanks. Diethylphalate, Di-n-butylphthalate, bis (2-Ethylhexyl) phthalate are known to be common laboratory contaminants. Positive sample results are to be reported unless the concentration of the compound in the sample is less than or equal to 10 times the amount in any blank for common phthalate contaminants, or 5 times the amount for other compounds.

Phenol was detected in three soil samples at 49.0, 50.59, and 64 ug/L. Sample results are greater than five times the blank results for all real samples and therefore, the results remain as positive sample results. Maximum concentrations of Diethylphalate, Di-n-butylphthalate, and bis (2-Ethylhexyl) phthalate in soil samples also exceeded ten times the concentrations in blanks and therefore would remain as positive sample results. Qualifying results less than ten times the concentration in blanks would not impact the scoring of the Building 123 site because only the maximum result is used for scoring. Therefore soil samples with phthalate results below ten times the concentration in blanks were not qualified and treated as detects. Table 3-4 presents equipment rinsate results.

Table 3-4 Equipment Rinsate Sample Results

RIN	98A5067-001		98A5178-014		98A5145-012	
Borehole	1		42-20		23-1	
Analyte	Results (ug/L)	Qualifier	Results (ug/L)	Qualifier	Results (ug/L)	Qualifier
VOCs	All VOCs	U			All VOCs	U
Acetone(V)			7.23			
Semi-VOCs						
Phenol (SV)			3.19	J	5.0	J
Diethylphalate (SV)			1.57	J	2.0	J
Di-n-butylphthalate (SV)			1.51	J		
bis (2-Ethylhexyl) phthalate	59.0		34.01		11.0	JB
Radionuclides	**Results (ug/L)**	**Qualifier**	**Results (ug/L)**	**Qualifier**	**Results (ug/L)**	**Qualifier**
Am-241	1.67E-02	NA	5.27E-03	NA	2.42E-02	NA
Pu-239/240	6.91E-02	NA	1.03E-01	NA	1.11E-02	NA
Uranium-233/234	4.14E-02	NA	5.75E-02	NA	7.14E-02	NA
Uranium-235	8.19E-03	NA	5.65E-03	NA	3.35E-02	NA
Uranium-238	2.51E-03	NA	4.27E-02	NA	3.34E-02	NA

NA = Not available

4.0 CONCLUSION

Preliminary results indicate that DQOs specific to the original work plans were met with respect to accuracy, and precision with the exception of accuracy for semi-volatile compounds. Fundamental quality controls on the radiochemistry and organic compound analyses have produced data which appear to be adequate to allow use within the context of their representative three-dimensional locations, and with respect to current RFCA action levels (Tier I or II). However, borings designed to characterize the OPWLs and Underground Process Waste Lines were not constructed within the pipeline trench and therefore sample results do not represent the condition of the pipelines but may be used to characterize under building contamination, unpaved areas and random areas west of Building 123.

5.0 RESULTS

The following tables represent the maximum activities detected for all Radionuclides, VOCs, Semi-VOCs, Metals and Nitrates sampled and analyzed from the Building 123 area. These values will be utilized by Environmental Restoration for the ranking/evaluation of the UBC at Building 123.

Tables with complete analytical results from subsurface soils at Building 123 can be found in Appendix A through E of this document.

Table 5-1 Radionuclides - Maximum Activities Detected

Analyte	CAS No.	RIN	Location	Sample Depth (ft)	Results (pCi/g)	Qualifier
Americium-241	14596-10-2	98A5145-002	22	0-6	9.87E-02	J
Curium-243/244		98A5145-002	22	0-6	4.62E-01	
Plutonium-239/240	10-12-8	98A5145-004	24-2	0-6	2.13E-01	NA
Plutonium-242		98A5178-005	46-24	0-6	2.39E+00	
Uranium-232	7440-61-1	98A5080-005	6	0-5.8	5.67E-02	NA
Uranium-233/234	11-08-5	98A5178-008	42-20	0-6	1.23E+00	
Uranium-235	11-08-5	98A5110-002	12	0-5.6	1.98E-01	NA
Uranium-238	15117-96-1	98A5110-007	17	0-5.4	7.94-01	J
Strontium-89/90	11-10-9	98A5080-005	6	0-5.8	1.31E+00	NA

NA - Qualifier not available from preliminary data sheet

Table 5-2 Volatile Organic Compounds - Maximum Concentration Detected

Analyte	CAS No.	RIN	Borehole	Sample Depth (ft)	Results (ug/Kg)	Qualifier
Methylene chloride	75-09-2	98A5110-003.003	13	0.5-1.5	34.	B
Acetone	67-64-1	98A5110-010.003	20	0.5-1.5	86.24	
Carbon disulfide	75-15-0	98A5178-004.003	45-23	0.5-1.5	4.93	J
Chloroform	67-66-3	98A5178-005.003	46-24	0.5-1.5	2.47	J
2-Butanone	78-93-3	98A5110-003.003	13	0.5-1.5	72.	
Carbon tetrachloride	56-23-5	98A5110-003.003	13	0.5-1.5	11.	
Trichloroethene	79-01-6	98A5163-010.003	40-18	0.5-1.5	5.23	
4-Methyl-2-pentanone	108-10-1	98A5178-005.003	46-24	0.5-1.5	2.16	J
Tetrachloroethene	127-18-4	98A5110-002.003	12	0.5-1.5	5.	J
Toluene	108-88-3	98A5110-003.003	13	0.5-1.5	5.	J
Ethylbenzene	100.5-1.51-4	98A5110-003.003	13	0.5-1.5	1.	J
Xylene (total)	1330-20-7	98A5163-007.003	37-15	0.5-1.5	8.86	
m,p-Xylenes	13-302-07	98A5163-007.003	37-15	0.5-1.5	5.92	
o-Xylene	95-47-6	98A5163-007.003	37-15	0.5-1.5	2.58	
Naphthalene	91-20-3	98A5110-003.003	13	0.5-1.5	16.	
1,2,3-Trichlorobenzene	87-61-6	98A5110-003.003	13	0.5-1.5	7.	
1,2,4-Trichlorobenzene	120-82-1	98A5110-003.003	13	0.5-1.5	6.	
1,2,4-Trimethylbenzene	95-63-6	98A5178-005.003	46-24	0.5-1.5	6.01	
1,1,2-Trichlorotrifluorethane	76-13-1	98A5110-003.003	13	0.5-1.5	1.	J

Table 5-3 Semi-Volatile Organic Compounds - Maximum Concentration Detected

Analyte	CAS No.	RIN	Borehole	Sample Depth (ft)	Results (ug/Kg)	Qualifier
Phenol	108-95-2	5145-009.004	29-7	0-6	65.	J
2-Chlorophenol	95-57-8	5145-009.004	29-7	0-6	68.	J
Benzoic Acid	65-85-0	5163-003.004	33-11	0-6	236.75	J
Naphthalene	91-20-3	5110-008.004	18	0-6	230.	J
4-Chloro-3-methylphenol	59-50-7	5145-009.004	29-7	0-6	58.	J
2-Methylnaphthalene	91-57-6	5110-006.004	16	0-5	280.	J
Acenaphthene	83-32-9	5110-006.004	16	0-5	340.	J
4-Nitrophenol	100-02-7	5163-004.004	34-12	0-5.4	196.19	J
Dibenzofuran	132-64-9	5110-008.004	18	0-6	140.	J
Diethylphthalate	84-66-2	5067-001.004	1	0-5.8	38.	J
Fluorene	86-73-7	5110-008.004	18	0-6	280.	J
Pentachlorophenol	87-86-5	5145-007.004	27-5	0-5	36.	J
Phenanthrene	85-01-8	5110-006.004	16	0-5	1,500.	
Anthracene	120-12-7	5110-008.004	18	0-6	470.	
Di-n-butylphthalate	84-74-2	5067-001.004	1	0-5.8	55.	J
Fluoranthene	206-44-0	5110-006.004	16	0-5	1,500.	
Pyrene	129-00-0	5110-006.004	16	0-5	1,300.	
Butylbenzylphthalate	85-68-7	5163-004.004	34-12	0-5.4	37.62	J
Benzo(a)anthracene	56-55-3	5110-006.004	16	0-5	570.	
Chyrsene	218-01-9	5110-006.004	16	0-5	660.	
bis(2-Ethylhexyl)phthalate	117-81-7	5145-004.004	24-2	0-6	350.	J
Benzo(b)fluoranthene	205-99-2	5110-006.004	16	0-5	670.	
Benzo(k)fluoranthene	207-08-9	5110-006.004	16	0-5	520.	
Benzo(a)pyrene	50-32-8	5110-006.004	16	0-5	760.	
Indeno(1,2,3-cd)pyrene	193-39-5	5110-006.004	16	0-5	500.	
Dibenz(a,h)anthracene	53-70-3	5110-006.004	16	0-5	300.	J
Benzo(g,h,i)perylene	191-24-2	5110-006.004	16	0-5	550.	

Table 5-4 Metals - Maximum Concentration Detected

Analyte	CAS No.	RIN	Borehole	Sample Depth (ft)	Results (mg/Kg)	Qualifier
Aluminum	7429-90-5	98A5080-001.002	2	0- 6	22,700.	
Antimony	7440-36-0	98A5178-008.002	42-20	0-6	6.7	B
Arsenic	7440-38-2	98A5178-008.002	42-20	0-6	14.	B
Barium	7440-39-3	98A5110-007.002	17	0-5.4	102.	
Beryllium	7440-41-7	98A5163-001.002	31-9	0-6	1.7	
Cadmium	7440-43-9	98A5178-004.002	45-23	0-6	1.2	
Calcium	7440-70-2	98A5110-006.002	16	0-5	22,500.	
Chromium	7440-47-3	98A5178-008.002	42-20	0-6	36.	
Cobalt	7440-48-4	98A5163-004.002	34-12	0-5.4	21.1	
Copper	7440-50-8	98A5178-005.002	46-24	0-6	19.3	
Iron	7439-89-6	98A5178-006.002	47-25	0-6	21,800.	
Lead	7439-92-1	98A5178-006.002	47-25	0-6	122.	
Lithium	7439-93-2	98A5178-007.002	48-26	0-6	14.4	B
Magnesium	7439-95-4	98A5110-008.002	18	0-6	3,250.	
Manganese	7439-96-5	98A5145-005.002	25-3	0-6	234.	
Mercury	7439-97-6	98A5163-003.002	33-11	0-6	.49	
Molybdenum	7439-98-7	98A5178-005.002	46-24	0-6	8.2	B
Nickel	7440-02-0	98A5178-006.002	47-25	0-6	18.5	
Potassium	7440-09-7	98A5178-005.002	46-24	0-6	2,160.	
Selenium	7782-49-2	98A5178-008.002	42-20	0-6	.94	B
Silver	7440-22-4	98A5163-007.002	37-15	0-6	1.8	
Sodium	7440-23-5	98A5178-006.002	47-25	0-6	9,750.	
Strontium	7440-24-6	98A5110-008.002	18	0-6	49.3	
Thallium	7440-28-0	98A5163-003.002	33-11	0-6	1.	B
Tin	7440-31-5	98A5178-006.002	47-25	0-6	3.1	B
Uranium	7440-62-2	98A5110-010.002	20	0-6	1.3	B
Vanadium	7440-62-2	98A5110-010.002	20	0-6	54.6	
Zinc	7440-66-6	98A5178-005.002	46-24	0-6	46.9	

Table 5-5 Nitrates - Maximum Concentration Detected

Analyte	CAS No.	RIN	Borehole	Sample Depth (ft)	Result (ug/Kg)	Qualifier
Nitrate/Nitrite as N	1-005	98A5163-002.005	32-10	0-5	66.6	

6.0 REFERENCES

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Appendix A

Building 123 Subsurface Soils - Radionuclide Results

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin		98A5067-001		98A5080-001		98A5080-002		98A5080-003		98A5080-004		98A5080-005		98A5080-006		98A5080-007	
Borehole		1		2		3		4		5		6		7		8	
Depth (ft)		0-5.8		0-6		0-6		0-6		0-6		0-5.8		0-6		0-5.7	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	2.82E-03	NA	6.16E-03	NA	2.83E-02	NA	1.70E-02	NA	6.92E-02	NA	-3.60E-03	NA	-1.11E-02	NA	2.88E-02	NA
Curium-243/244		1.31E-02	NA	3.89E-02	NA	4.81E-02	NA	3.44E-02	NA	4.20E-02	NA	2.16E-02	NA	2.33E-02	NA	3.41E-02	NA
Plutonium-239/240	10-12-8	3.48E-02	NA	1.62E-02	NA	2.85E-02	NA	1.68E-02	NA	1.17E-02	NA	2.72E-02	NA	2.67E-02	NA	7.39E-02	NA
Plutonium-242		6.41E-03	NA	-1.94E-02	NA	1.26E-02	NA	-5.76E-03	NA	1.86E-02	NA	6.86E-02	NA	5.03E-03	NA	8.13E-02	NA
Uranium-232	7440-61-1	1.06E-02	NA	3.56E-03	NA	-3.75E-02	NA	1.10E-02	NA	-1.32E-02	NA	5.67E-02	NA	4.79E-03	NA	1.03E-03	NA
Uranium-233/234	11-08-5	5.70E-01	NA	5.04E-01	NA	6.65E-01	NA	6.26E-01	NA	4.51E-01	NA	5.72E-01	NA	7.84E-01	NA	5.43E-01	NA
Uranium-235	11-08-5	3.40E-02	NA	3.05E-02	NA	5.82E-02	NA	4.67E-02	NA	4.22E-02	NA	5.29E-02	NA	2.91E-02	NA	3.45E-02	NA
Uranium-238+D	15117-96-1	6.85E-01	NA	5.04E-01	NA	6.35E-01	NA	6.09E-01	NA	4.35E-01	NA	5.72E-01	NA	7.29E-01	NA	6.56E-01	NA
Strontium-89/90	11-10-9	2.38E-02	NA	-8.54E-02	NA	2.53E-01	NA	-2.52E-01	NA	-2.62E-01	NA	1.31E+00	NA	1.09E+00	NA	9.19E-01	NA

NA - not available from preliminary data.

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin		98A5080-008		98A5080-009		98A5110-001.006		98A5110-002.006		98A5110-003.006		98A5110-004		98A5110-005		98A5110-006	
Borehole		9		10		11		12		13		14		15		16	
Depth (ft)		0-6		0-5.2		0-5		0-5.6		0-5		0-4		0-4.5		0-5	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	5.54E-04	NA	-5.18E-03	NA	6.00E-03	NA	3.98E-03	NA	5.69E-03	NA	1.05E-02	U	8.69E-04	U	4.27E-03	U
Curium-243/244		4.55E-02	NA	2.82E-02	NA	2.89E-02	NA	1.15E-02	NA	1.88E-02	NA	1.07E-02	J	3.10E-02	J	1.27E-02	U
Plutonium-239/240	10-12-8	7.63E-03	NA	1.72E-02	NA	2.00E-02	NA	1.91E-02	NA	1.59E-02	NA	2.41E-02	U	2.12E-02	U	2.13E-02	U
Plutonium-242		1.17E-02	NA	3.90E-02	NA	1.66E-02	NA	1.09E-02	NA	1.45E-02	NA	2.19E-02	U	2.11E-02	U	7.92E-03	U
Uranium-232	7440-61-1	-1.96E-02	NA	8.63E-03	NA	1.14E-02	NA	2.46E-02	NA	1.13E-02	NA	2.17E-02	U	1.49E-02	U	1.27E-02	U
Uranium-233/234	11-08-5	4.77E-01	NA	6.48E-01	NA	7.39E-01	NA	7.38E-01	NA	6.38E-01	NA	6.17E-01	J	6.87E-01	J	5.63E-01	J
Uranium-235	11-08-5	1.45E-02	NA	3.50E-02	NA	3.31E-02	NA	1.98E-01	NA	1.07E-01	NA	4.13E-02	J	3.85E-02	U	2.94E-02	U
Uranium-238+D	15117-96-1	5.51E-01	NA	6.10E-01	NA	7.68E-01	NA	5.99E-01	NA	7.58E-01	NA	7.26E-01	J	8.89E-01	J	6.54E-01	J
Strontium-89/90	11-10-9	-6.92E-02	NA	1.94E-01	NA	-2.65E-01	NA	5.98E-02	NA	-2.58E-01	NA	-1.04E-01	U	-5.04E-02	U	-3.53E-02	U

NA - not available from preliminary data.

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin		98A5110-007		98A5110-008		98A5110-009		98A5110-010		98A5145-001		98A5145-002		98A5145-003		98A5145-004	
Borehole		17		18		19		20		21		22		23-1		24-2	
Depth (ft)		0-5.4		0-6		0-5.7		0-6		0-4		0-6		0-5.6		0-6	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	1.80E-03	U	-8.49E-01	U	2.36E-02	U	9.32E-03	U	-8.78E-03	U	9.87E-02	J	2.27E-02	U	-2.17E+00	NA
Curium-243/244		5.04E-02	J	3.39E-02	U	1.65E-02	U	3.10E-02	U	1.26E-02	U	4.62E-01		1.25E-02	U	2.04E-02	NA
Plutonium-239/240	10-12-8	2.48E-02	J	9.15E-02	J	6.23E-02	U	4.07E-02	U	1.33E-01	J	1.22E-02	U	7.18E-02	U	2.13E-01	NA
Plutonium-242		1.29E-02	U	4.80E-02	U	-2.94E-04	U	1.90E-02	U	-1.11E-02	U	1.22E-02	U	-1.03E-02	U	5.00E-03	NA
Uranium-232	7440-61-1	1.17E-02	U	5.63E-02	J	2.17E-02	U	2.78E-02	U	1.34E-02	U	1.36E-02	U	1.92E-02	U	1.54E-02	NA
Uranium-233/234	11-08-5	7.18E-01	J	7.16E-01	J	8.64E-01	J	8.40E-01	J	5.73E-01	J	4.72E-01	J	7.09E-01	J	8.81E-01	NA
Uranium-235	11-08-5	6.97E-02	J	2.53E-02	U	6.35E-02	J	2.24E-02	U	1.02E-01	J	2.44E-02	J	6.24E-02	J	7.38E-02	NA
Uranium-238+D	15117-96-1	7.94-01	J	7.82E-01	J	7.98E-01	J	6.62E-01	J	7.48E-01	J	5.48E-01	J	6.94E-01	J	9.26E-01	NA
Strontium-89/90	11-10-9	-1.30E-01	U	9.60E-03	U	1.81E-01	U	-1.22E-01	U	-6.18E-02	U	-1.48E-01	U	-7.44E-02	NA	-1.46E-01	NA

NA - not available from preliminary data.

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin Borehole Depth (ft)		98A5145-005 25-3 0-6		98A5145-006 26-4 0-6		98A5145-007 27-5 0-5		98A5145-008 28-6 0-6		98A5145-009 29-7 0-6		98A5145-010 30-8 0-6		98A5163-001 31-9 0-6		98A5163-002 32-10 0-5	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	1.12E-02	NA	-3.75E-03	NA	6.56E-03	NA	-6.03E-03	NA	1.23E-02	NA	2.83E-03	NA	4.17E-03	U	1.11E-02	U
Curium-243/244		3.15E-02	NA	1.93E-02	NA	2.82E-03	NA	0.00E+00	NA	0.00E+00	NA	1.93E-02	NA	3.01E-02	U	-2.04E-03	U
Plutonium-239/240	10-12-8	2.05E-02	NA	6.20E-02	NA	2.13E-02	NA	4.66E-03	NA	1.13E-01	NA	-1.12E-02	NA	7.59E-02	U	8.49E-02	J
Plutonium-242		2.31E-02	NA	3.14E-02	NA	7.10E-03	NA	1.97E-02	NA	2.87E-02	NA	1.21E-02	NA	2.09E-02	U	8.49E-02	J
Uranium-232	7440-61-1	-1.03E-03	NA	2.98E-03	NA	8.54E-03	NA	5.79E-03	NA	2.69E-03	NA	-1.91E-04	NA	-6.22E-03	U	2.16E-02	J
Uranium-233/234	11-08-5	7.91E-01	NA	7.46E-01	NA	9.31E-01	NA	6.95E-01	NA	5.24E-01	NA	5.01E-01	NA	6.96E-01	J	7.84E-01	J
Uranium-235	11-08-5	4.18E-02	NA	4.44E-02	NA	4.82E-02	NA	3.54E-02	NA	5.30E-02	NA	2.88E-02	NA	3.89E-02	J	6.01E-02	J
Uranium-238+D	15117-96-1	8.51E-01	NA	6.46E-01	NA	9.49E-01	NA	7.49E-01	NA	5.28E-01	NA	5.37E-01	NA	7.32E-01	J	8.61E-01	J
Strontium-89/90	11-10-9	-1.93E-01	NA	2.32E-02	NA	-4.42E-02	NA	-8.86E-02	NA	7.77E-02	NA	9.40E-03	NA	-1.26E-01	U	-2.76E-01	U

NA - not available from preliminary data.

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin		98A5163-003		98A5163-004		98A5163-005		98A5163-006		98A5163-007		98A5163-008		98A5163-009		98A5163-010	
Borehole		33-11		34-12		35-13		36-14		37-15		38-16		39-17		40-18	
Depth (ft)		0-6		0-5.4		0-5.1		0-6		0-6		0-6		0-6		0-6	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	1.39E-02	U	3.17E-03	U	3.67E-03	U	3.77E-02	J	-9.03E-03	U	1.64E-02	U	3.63E-03	U	8.60E-03	U
Curium-243/244		3.18E-02	J	3.97E-02	J	2.02E-02	U	1.21E-02	U	3.01E-02	U	3.49E-02	U	4.40E-02	J	6.99E-03	U
Plutonium-239/240	10-12-8	-2.76E-03	U	1.68E-02	U	-5.60E-03	U	1.26E-02	U	0.00E+00	U	1.10E-02	U	-4.21E-03	U	1.85E-02	U
Plutonium-242		2.02E-02	U	2.95E-04	U	-2.11E-02	U	1.77E-02	U	0.00E+00	U	4.06E-03	U	-8.42E-03	U	-5.04E-03	U
Uranium-232	7440-61-1	-1.30E-03	U	-2.45E-02	U	7.58E-03	U	8.91E-03	U	9.78E-04	U	4.97E-03	U	9.30E-03	U	-2.93E-03	U
Uranium-233/234	11-08-5	6.44E-01	J	5.54E-01	J	7.85E-01	J	6.12E-01	J	7.76E-01	J	7.99E-01	J	5.04E-01	J	8.14E-01	J
Uranium-235	11-08-5	5.20E-02	J	7.36E-02	J	4.63E-02	J	2.21E-02	J	2.96E-02	U	3.50E-02	J	6.89E-02	J	3.32E-02	U
Uranium-238+D	15117-96-1	6.44E-01	J	6.49E-01	U	7.83E-01	J	4.69E-01	J	6.98E-01	J	8.73E-01	J	6.48E-01	J	9.22E-01	J
Strontium-89/90	11-10-9	-2.18E-02	U	2.17E-01	U	-9.30E-01	U	1.08E-01	U	-8.53E-02	U	1.80E-01	U	5.21E-02	U	-3.20E-01	U

NA - not available from preliminary data.

APPENDIX A
Building 123 Subsurface Soils
Radionuclide Results

Rin		98A5178-001		98A5178-008		98A5178-002		98A5178-003		98A5178-004		98A5178-005		98A5178-006		98A5178-007	
Borehole		41-19		42-20		43-21		44-22		45-23		46-24		47-25		48-26	
Depth (ft)		0-6		0-6		0-6		0-6		0-6		0-6		0-6		0-6	
Analyte	CAS No.	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier	Result (pCi/g)	Qualifier
Americium-241	14596-10-2	9.03E-03	U	2.31E-03	U	1.10E-02	U	-6.71E-03	U	1.14E-02	U	1.88E-02	U	5.94E-02	U	-3.75E-03	U
Curium-243/244		9.25E-03	U	-1.65E-03	U	3.49E-02	U	3.39E-02	J	3.74E-02	J	3.78E-02	J	9.44E-02	J	3.14E-02	U
Plutonium-239/240	10-12-8	1.67E-02	U	4.44E-03	U	2.11E-02	U	1.18E-02	U	3.74E-03	U	4.14E-03	U	1.19E-02	J	8.00E-03	U
Plutonium-242		-2.41E-02	U	2.35E+00		4.34E-03	U	1.18E-02	U	1.44E-02	U	2.39E+00		2.38E+00		2.33E+00	
Uranium-232	7440-61-1	1.25E-02	U	7.19E-03	U	-1.29E-02	U	3.06E-02	U	2.55E-02	U	7.10E-03	U	6.77E-03	U	-1.39E-03	J
Uranium-233/234	11-08-5	7.16E-01	J	1.23E+00		6.71E-01	J	7.27E-01	J	6.99E-01	J	8.60E-01	J	7.02E-01	J	7.45E-01	J
Uranium-235	11-08-5	3.72E-02	J	6.34E-02	J	5.34E-02	J	5.36E-02	J	2.80E-02	U	7.51E-02	J	4.50E-02	J	6.52E-02	J
Uranium-238+D	15117-96-1	6.47E-01	J	1.00E+00		8.59E-01	J	9.99E-01	J	7.27E-01	J	9.98E-01	J	8.26E-01	J	8.15E-01	J
Strontium-89/90	11-10-9	-1.17E-01	U	4.49E-02	U	6.13E-02	U	-3.80E-02	U	1.02E-01	U	5.80E-02	U	8.08E-02	U	3.74E-02	U

NA - not available from preliminary data.

Appendix B

Building 123 Subsurface Soils - VOC Results

APPENDIX B

Building 123 Subsurface Soils

Volatile Organic Compound Results - Detects Only

RIN		98A5067-001.020RE		98A5080-001.003RE		98A5080-002.003		98A5080-003.003		98A5080-004.003		98A5080-005.003RE		98A5080-006.004		98A5080-007.004	
Borehole		1		2		3		4		5		6		7		8	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3																
Bromomethane	74-83-9																
Vinyl chloride	75-01-4																
Chloroethane	75-00-3																
Methylene chloride	75-09-2	6.						3.87	J	4.74	J			4.13	J		
Acetone	67-64-1																
Carbon disulfide	75-15-0							3.75	J	2.49	J						
1,1-Dichloroethene	75-35-4																
1,1-Dichloroethane	75-34-3																
Chloroform	67-66-3																
1,2-Dichloroethane	107-06-2																
2-Butanone	78-93-3																
1,1,1-Trichloroethane	71-55-6																
Carbon tetrachloride	56-23-5																
Bromodichloromethane	75-27-4																
1,2-Dichloropropane	78-87-5																
cis-1,3-Dichloropropene	10061-01-5																
Trichloroethene	79-01-6																
Dibromochloromethane	124-48-1																
1,1,2-Trichloroethane	79-00.5-1.5																
Benzene	71-43-2																
trans-1,3-Dichloropropene	10061-02-6																
Bromoform	75-25-2																
4-Methyl-2-pentanone	108-10-1																
2-Hexanone	591-78-6																
Tetrachloroethene	127-18-4																
Toluene	108-88-3																
1,1,2,2-Tetrachloroethane	79-34-5																
Chlorobenzene	108-90-7																
Ethylbenzene	100.5-1.51-4																
Stryene	100.5-1.52-5																
Xylene (total)	1330-20-7																
m,p-Xylenes	13-302-07																
o-Xylene	95-47-6																
1,2-Dibromo-3-chloropropane	96-12-8																
1,2-Dichlorobenzene	95-50-1																
1,3-Dichlorobenzene	541-73-1																
1,4-Dichlorobenzene	106-46-7																
Hexachlorobutadiene	87-68-3																
Naphthalene	91-20-3																
1,2,3-Trichlorobenzene	87-61-6																
1,2,4-Trichlorobenzene	120-82-1																
1,2,4-Trimethylbenzene	95-63-6																
1,1,2-Trichlorotrifluorethane	76-13-1																

APPENDIX B
Building 123 Subsurface Soils
Volatile Organic Compound Results - Detects Only

RIN		98A5080-008.003		98A5080-009-004		98A5110-001.003		98A5110-002.003		98A5110-003.003		98A5110-004.003		98A5110-005.003	
Borehole		9		10		11		12		13		14		15	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3														
Bromomethane	74-83-9														
Vinyl chloride	75-01-4														
Chloroethane	75-00-3														
Methylene chloride	75-09-2			2.82	J	1.	JB	24.	B	34.	B	3.27	J	2.82	J
Acetone	67-64-1					30.		69.		71.	D	12.4		3.22	J
Carbon disulfide	75-15-0							2.	J	2.	J				
1,1-Dichloroethene	75-35-4														
1,1-Dichloroethane	75-34-3														
Chloroform	67-66-3									1.	J				
1,2-Dichloroethane	107-06-2														
2-Butanone	78-93-3									72.					
1,1,1-Trichloroethane	71-55-6														
Carbon tetrachloride	56-23-5									11.					
Bromodichloromethane	75-27-4														
1,2-Dichloropropane	78-87-5														
cis-1,3-Dichloropropene	10061-01-5														
Trichloroethene	79-01-6							3.	J						
Dibromochloromethane	124-48-1														
1,1,2-Trichloroethane	79-00.5-1.5														
Benzene	71-43-2														
trans-1,3-Dichloropropene	10061-02-6														
Bromoform	75-25-2														
4-Methyl-2-pentanone	108-10-1														
2-Hexanone	591-78-6														
Tetrachloroethene	127-18-4							5.	J						
Toluene	108-88-3									5.	J				
1,1,2,2-Tetrachloroethane	79-34-5														
Chlorobenzene	108-90-7														
Ethylbenzene	100.5-1.51-4									1.	J				
Stryene	100.5-1.52-5														
Xylene (total)	1330-20-7									5.	J				
m,p-Xylenes	13-302-07														
o-Xylene	95-47-6														
1,2-Dibromo-3-chloropropane	96-12-8														
1,2-Dichlorobenzene	95-50-1														
1,3-Dichlorobenzene	541-73-1														
1,4-Dichlorobenzene	106-46-7														
Hexachlorobutadiene	87-68-3														
Naphthalene	91-20-3					13.		13.		16.					
1,2,3-Trichlorobenzene	87-61-6							7.		7.					
1,2,4-Trichlorobenzene	120-82-1							6.		6.					
1,2,4-Trimethylbenzene	95-63-6														
1,1,2-Trichlorotrifluorethane	76-13-1							1.	J	1.	J				

APPENDIX B

Building 123 Subsurface Soils

Volatile Organic Compound Results - Detects Only

RIN		98A5110-006.003		98A5110-007.003		98A5110-008.003		98A5110-009.003		98A5110-010.003		98A5145-001.003		98A5145-002.003	
Borehole		16		17		18		19		20		21		22	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3														
Bromomethane	74-83-9														
Vinyl chloride	75-01-4														
Chloroethane	75-00-3														
Methylene chloride	75-09-2	3.26	J	2.59	J	2.96	J	2.51	J	2.86	J	2.	J		
Acetone	67-64-1	5.53		7.03		3.78	J	3.74	J	86.24		5.		9.	
Carbon disulfide	75-15-0														
1,1-Dichloroethene	75-35-4														
1,1-Dichloroethane	75-34-3														
Chloroform	67-66-3														
1,2-Dichloroethane	107-06-2														
2-Butanone	78-93-3									12.22					
1,1,1-Trichloroethane	71-55-6														
Carbon tetrachloride	56-23-5														
Bromodichloromethane	75-27-4														
1,2-Dichloropropane	78-87-5														
cis-1,3-Dichloropropene	10061-01-5														
Trichloroethene	79-01-6														
Dibromochloromethane	124-48-1														
1,1,2-Trichloroethane	79-00.5-1.5														
Benzene	71-43-2														
trans-1,3-Dichloropropene	10061-02-6														
Bromoform	75-25-2														
4-Methyl-2-pentanone	108-10-1														
2-Hexanone	591-78-6														
Tetrachloroethene	127-18-4														
Toluene	108-88-3														
1,1,2,2-Tetrachloroethane	79-34-5														
Chlorobenzene	108-90-7														
Ethylbenzene	100.5-1.51-4														
Stryene	100.5-1.52-5														
Xylene (total)	1330-20-7														
m,p-Xylenes	13-302-07														
o-Xylene	95-47-6														
1,2-Dibromo-3-chloropropane	96-12-8														
1,2-Dichlorobenzene	95-50-1														
1,3-Dichlorobenzene	541-73-1														
1,4-Dichlorobenzene	106-46-7														
Hexachlorobutadiene	87-68-3														
Naphthalene	91-20-3					7.05		9.96							
1,2,3-Trichlorobenzene	87-61-6														
1,2,4-Trichlorobenzene	120-82-1														
1,2,4-Trimethylbenzene	95-63-6														
1,1,2-Trichlorotrifluoroethane	76-13-1														

APPENDIX B

Building 123 Subsurface Soils

Volatile Organic Compound Results - Detects Only

RIN		98A5145-003.003		98A5145-004.003		98A5145-005.003		98A5145-006.003		98A5145-007.003		98A5145-008.003		98A5145-009.003		98A5145-010.003RE	
Borehole		23-1		24-2		25-3		26-4		27-5		28-6		29-7		30-8	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3																
Bromomethane	74-83-9																
Vinyl chloride	75-01-4																
Chloroethane	75-00-3																
Methylene chloride	75-09-2	2.	J	3.	J	5.	J							5.	J		
Acetone	67-64-1	8.		22.		54.										5.	J
Carbon disulfide	75-15-0																
1,1-Dichloroethene	75-35-4																
1,1-Dichloroethane	75-34-3																
Chloroform	67-66-3	2.	J														
1,2-Dichloroethane	107-06-2																
2-Butanone	78-93-3																
1,1,1-Trichloroethane	71-55-6																
Carbon tetrachloride	56-23-5																
Bromodichloromethane	75-27-4																
1,2-Dichloropropane	78-87-5																
cis-1,3-Dichloropropene	10061-01-5																
Trichloroethene	79-01-6																
Dibromochloromethane	124-48-1																
1,1,2-Trichloroethane	79-00.5-1.5																
Benzene	71-43-2																
trans-1,3-Dichloropropene	10061-02-6																
Bromoform	75-25-2																
4-Methyl-2-pentanone	108-10-1																
2-Hexanone	591-78-6																
Tetrachloroethene	127-18-4																
Toluene	108-88-3																
1,1,2,2-Tetrachloroethane	79-34-5																
Chlorobenzene	108-90-7																
Ethylbenzene	100.5-1.51-4																
Stryene	100.5-1.52-5																
Xylene (total)	1330-20-7																
m,p-Xylenes	13-302-07																
o-Xylene	95-47-6																
1,2-Dibromo-3-chloropropane	96-12-8																
1,2-Dichlorobenzene	95-50-1																
1,3-Dichlorobenzene	541-73-1																
1,4-Dichlorobenzene	106-46-7																
Hexachlorobutadiene	87-68-3																
Naphthalene	91-20-3																
1,2,3-Trichlorobenzene	87-61-6																
1,2,4-Trichlorobenzene	120-82-1																
1,2,4-Trimethylbenzene	95-63-6																
1,1,2-Trichlorotrifluoroethane	76-13-1																

APPENDIX B
Building 123 Subsurface Soils
Volatile Organic Compound Results - Detects Only

RIN		98A5163-001.003		98A5163-002.003RE		98A5163-003.003		98A5163-004.003		98A5163-005.003		98A5163-006.003		98A5163-007.003	
Borehole		31-9		32-10		33-11		34-12		35-13		36-14		37-15	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3														
Bromomethane	74-83-9														
Vinyl chloride	75-01-4														
Chloroethane	75-00-3														
Methylene chloride	75-09-2	30.		6.		15.13		24.01		20.47		20.76		8.9	
Acetone	67-64-1	22.		6.				6.91							
Carbon disulfide	75-15-0														
1,1-Dichloroethene	75-35-4														
1,1-Dichloroethane	75-34-3														
Chloroform	67-66-3														
1,2-Dichloroethane	107-06-2														
2-Butanone	78-93-3														
1,1,1-Trichloroethane	71-55-6														
Carbon tetrachloride	56-23-5														
Bromodichloromethane	75-27-4														
1,2-Dichloropropane	78-87-5														
cis-1,3-Dichloropropene	10061-01-5														
Trichloroethene	79-01-6														
Dibromochloromethane	124-48-1														
1,1,2-Trichloroethane	79-00.5-1.5														
Benzene	71-43-2														
trans-1,3-Dichloropropene	10061-02-6														
Bromoform	75-25-2														
4-Methyl-2-pentanone	108-10-1														
2-Hexanone	591-78-6														
Tetrachloroethene	127-18-4														
Toluene	108-88-3							3.9	J						
1,1,2,2-Tetrachloroethane	79-34-5														
Chlorobenzene	108-90-7														
Ethylbenzene	100.5-1.51-4														
Stryene	100.5-1.52-5														
Xylene (total)	1330-20-7													8.86	
m,p-Xylenes	13-302-07													5.92	
o-Xylene	95-47-6													2.58	
1,2-Dibromo-3-chloropropane	96-12-8														
1,2-Dichlorobenzene	95-50-1														
1,3-Dichlorobenzene	541-73-1														
1,4-Dichlorobenzene	106-46-7														
Hexachlorobutadiene	87-68-3														
Naphthalene	91-20-3														
1,2,3-Trichlorobenzene	87-61-6														
1,2,4-Trichlorobenzene	120-82-1														
1,2,4-Trimethylbenzene	95-63-6														
1,1,2-Trichlorotrifluorethane	76-13-1														

APPENDIX B

Building 123 Subsurface Soils

Volatile Organic Compound Results - Detects Only

RIN		98A5163-008.003		98A5163-009.003		98A5163-010.003		98A5178-001.003		98A5178-008.003		98A5178-002.003		98A5178-003.003		98A5178-004.003	
Borehole		38-16		39-17		40-18		41-19		42-20		43-21		44-22		45-23	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3																
Bromomethane	74-83-9																
Vinyl chloride	75-01-4																
Chloroethane	75-00-3																
Methylene chloride	75-09-2					2.84	J	4.41	J			4.07	J			5.49	
Acetone	67-64-1									8.44						4.68	J
Carbon disulfide	75-15-0															4.93	J
1,1-Dichloroethene	75-35-4																
1,1-Dichloroethane	75-34-3																
Chloroform	67-66-3																
1,2-Dichloroethane	107-06-2																
2-Butanone	78-93-3																
1,1,1-Trichloroethane	71-55-6																
Carbon tetrachloride	56-23-5																
Bromodichloromethane	75-27-4																
1,2-Dichloropropane	78-87-5																
cis-1,3-Dichloropropene	10061-01-5																
Trichloroethene	79-01-6					5.23											
Dibromochloromethane	124-48-1																
1,1,2-Trichloroethane	79-00.5-1.5																
Benzene	71-43-2																
trans-1,3-Dichloropropene	10061-02-6																
Bromoform	75-25-2																
4-Methyl-2-pentanone	108-10-1																
2-Hexanone	591-78-6																
Tetrachloroethene	127-18-4																
Toluene	108-88-3																
1,1,2,2-Tetrachloroethane	79-34-5																
Chlorobenzene	108-90-7																
Ethylbenzene	100.5-1.51-4																
Stryene	100.5-1.52-5																
Xylene (total)	1330-20-7																
m,p-Xylenes	13-302-07																
o-Xylene	95-47-6																
1,2-Dibromo-3-chloropropane	96-12-8																
1,2-Dichlorobenzene	95-50-1																
1,3-Dichlorobenzene	541-73-1																
1,4-Dichlorobenzene	106-46-7																
Hexachlorobutadiene	87-68-3																
Naphthalene	91-20-3																
1,2,3-Trichlorobenzene	87-61-6																
1,2,4-Trichlorobenzene	120-82-1																
1,2,4-Trimethylbenzene	95-63-6																
1,1,2-Trichlorotrifluorethane	76-13-1																

APPENDIX B
Building 123 Subsurface Soils
Volatile Organic Compound Results - Detects Only

RIN		98A5178-005.003		98A5178-006.003		98A5178-007.003	
Borehole		46-24		47-25		48-26	
Depth (ft)		0.5-1.5		0.5-1.5		0.5-1.5	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Chloromethane	74-87-3						
Bromomethane	74-83-9						
Vinyl chloride	75-01-4						
Chloroethane	75-00-3						
Methylene chloride	75-09-2						
Acetone	67-64-1	12.37		14.12		5.55	
Carbon disulfide	75-15-0						
1,1-Dichloroethene	75-35-4						
1,1-Dichloroethane	75-34-3						
Chloroform	67-66-3	2.47	J				
1,2-Dichloroethane	107-06-2						
2-Butanone	78-93-3						
1,1,1-Trichloroethane	71-55-6						
Carbon tetrachloride	56-23-5						
Bromodichloromethane	75-27-4						
1,2-Dichloropropane	78-87-5						
cis-1,3-Dichloropropene	10061-01-5						
Trichloroethene	79-01-6						
Dibromochloromethane	124-48-1						
1,1,2-Trichloroethane	79-00.5-1.5						
Benzene	71-43-2						
trans-1,3-Dichloropropene	10061-02-6						
Bromoform	75-25-2						
4-Methyl-2-pentanone	108-10-1	2.16	J				
2-Hexanone	591-78-6						
Tetrachloroethene	127-18-4					3.9	J
Toluene	108-88-3						
1,1,2,2-Tetrachloroethane	79-34-5						
Chlorobenzene	108-90-7						
Ethylbenzene	100.5-1.51-4						
Stryene	100.5-1.52-5						
Xylene (total)	1330-20-7						
m,p-Xylenes	13-302-07						
o-Xylene	95-47-6						
1,2-Dibromo-3-chloropropane	96-12-8						
1,2-Dichlorobenzene	95-50-1						
1,3-Dichlorobenzene	541-73-1						
1,4-Dichlorobenzene	106-46-7						
Hexachlorobutadiene	87-68-3						
Naphthalene	91-20-3						
1,2,3-Trichlorobenzene	87-61-6						
1,2,4-Trichlorobenzene	120-82-1						
1,2,4-Trimethylbenzene	95-63-6	6.01					
1,1,2-Trichlorotrifluorethane	76-13-1						

Appendix C

Building 123 Subsurface Soils - Semi-VOC Results

APPENDIX C
Building 123 Subsurface Soils
Semivolatile Organic Compounds - Detects Only

RIN		5067-001.004		5110-001.004RE		5110-002.004		5110-003.004		5110-004.004RE		5110-005.004		5110-006.004		5110-007.004		5110-008.004	
Borehole		1		11		12		13		14		15		16		17		18	
Depth (ft)		0-5.8		0-5		0-5.6		0-5		0-4		0-4.5		0-5		0-5.4		0-6	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Phenol	108-95-2												U						
bis(2-Chloroethyl)ether(V)	111-44-4												U						
2-Chlorophenol(V)	95-57-8												U						
1,3-Dichlorobenzene(V)	541-73-1												U						
1,4-Dichlorobenzene(V)	106-46-7												U						
Benzyl Alcohol	100-51-6												U						
1,2-Dichlorobenzene(V)	95-50-1												U						
2-Methylphenol	95-48-7												U						
bis(2-Chloroisopropyl)ether(V)	108-60-1												U						
4-Methylphenol	106-44-5												U						
n-Nitrosodipropylamine	621-64-7												U						
Hexachloroethane	67-72-1												U						
Nitrobenzene(V)	98-95-3												U						
Isophorone	78-59-1												U						
2-Nitrophenol	88-75-5												U						
2,4-Dimethylphenol(V)	105-67-9												U						
Benzoic Acid	65-85-0	200.	JB	180.	J			180.	J				U			230.	J	210.	J
bis(2-Chloroethoxy)methane(V)	111-91-1												U						
2,4-Dichlorophenol	120-83-2												U						
1,2,4-Trichlorobenzene(V)	120-82-1												U						
Naphthalene(V)	91-20-3												U	170.	J			230.	J
4-Chloroaniline	106-47-8												U						
Hexachlorobutadiene	87-68-3												U						
4-Chloro-3-methylphenol	59-50-7												U						
2-Methylnaphthalene(V)	91-57-6												U	280.	J			89.	J
Hexachlorocyclopentadiene	77-47-4												U						
2,4,6-Trichlorophenol	88-06-2												U						
2,4,5-Trichlorophenol	95-95-4												U						
2-Chloronaphthalene(V)	91-58-7												U						
2-Nitroaniline	88-74-4												U						
Dimethylphthalate	131-11-3												U						
Acenaphthylene(V)	208-96-8												U						
2,6-Dinitrotoluene	606-20-2												U						
3-Nitroaniline	99-09-2												U						
Acenaphthene(V)	83-32-9			34.	J								U	340.	J	71.	J	330.	J
2,4-Dinitrotoluene	121-14-2												U						
2,4-Dinitrophenol	51-28-5												U						
4-Nitrophenol(V)	100-02-7												U						
Dibenzofuran	132-64-9												U	130.	J			140.	J
Diethylphthalate	84-66-2	38.	J										U						
4-Chlorophenyl phenyl ether	7005-72-3												U						
Fluorene(V)	86-73-7												U	280.	J	51.	J	280.	J
4-Nitroaniline	100-01-6												U						
4,6-Dinitro-2-methylphenol(V)	534-52-1												U						
n-Nitrosodiphenylamine(V)	86-30-6												U						
4-Bromophenyl phenyl ether	101-55-3												U						
Hexachlorobenzene	118-74-1												U						
Pentachlorophenol	87-86-5												U						
Phenanthrene(V)	85-01-8			180.	J			72.	J	69.	J		U	1,500.		400.		1,400.	
Anthracene(V)	120-12-7			51.	J								U	410.		78.	J	470.	
Di-n-butylphthalate	84-74-2	55.	J										U						
Fluoranthene	206-44-0			210.	J			83.	J	95.	J		U	1,500.		370.		1,200.	
Pyrene	129-00-0			270.	J			100.	J	90.	J		U	1,300.		330.	J	1,100.	
Butylbenzylphthalate	85-68-7												U						
3,3-Dichlorobenzidine	91-94-1												U						
Benzo(a)anthracene	56-55-3			120.	J					42.	J		U	570.		140.	J	500.	
Chyrsene	218-01-9			130.	J					64.	J		U	660.		160.	J	520.	
bis(2-Ethylhexyl)phthalate	117-81-7					50.	J	100.	J	47.	J		U	49.	J				
Di-n-octylphthalate	117-84-0												U						
Benzo(b)fluoranthene	205-99-2			120.	J					41.	J		U	670.		120.	J	460.	
Benzo(k)fluoranthene	207-08-9			89.	J					61.	J		U	520.		160.	J	480.	
Benzo(a)pyrene	50-32-8			140.	J					67.	J		U	760.		180.	J	590.	
Indeno(1,2,3-cd)pyrene	193-39-5			310.	J					40.	J		U	500.		98.	J	390.	
Dibenz(a,h)anthracene	53-70-3												U	300.	J	66.	J	230.	J
Benzo(g,h,i)perylene	191-24-2			140.	J					48.	J		U	550.		110.	J	420.	

Samples from Boreholes 2-10 exceeded sample holding time.

APPENDIX C
Building 123 Subsurface Soils
Semivolatile Organic Compounds - Detects Only

RIN		5110-009.004		5110-010.004RE		5145-001.004		5145-001.004RE		5145-002.004RE		5145-003.004		5145-004.004		5145-005.004		5145-006.004	
Borehole		19		20		21		21		22		23-1		24-2		25-3		26-4	
Depth (ft)		0-5.7		0-6		0-4		0-4		0-6		0-5.6		0-6		0-6		0-6	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Phenol	108-95-2										U							49.	J
bis(2-Chloroethyl)ether(V)	111-44-4										U								
2-Chlorophenol(V)	95-57-8										U								
1,3-Dichlorobenzene(V)	541-73-1										U								
1,4-Dichlorobenzene(V)	106-46-7										U								
Benzyl Alcohol	100-51-6										U								
1,2-Dichlorobenzene(V)	95-50-1										U								
2-Methylphenol	95-48-7										U								
bis(2-Chloroisopropyl)ether(V)	108-60-1										U								
4-Methylphenol	106-44-5										U								
n-Nitrosodipropylamine	621-64-7										U								
Hexachloroethane	67-72-1										U								
Nitrobenzene(V)	98-95-3										U								
Isophorone	78-59-1										U								
2-Nitrophenol	88-75-5										U								
2,4-Dimethylphenol(V)	105-67-9										U								
Benzoic Acid	65-85-0	200.	J	220.	J						U							220.	JB
bis(2-Chloroethoxy)methane(V)	111-91-1										U								
2,4-Dichlorophenol	120-83-2										U								
1,2,4-Trichlorobenzene(V)	120-82-1										U								
Naphthalene(V)	91-20-3	84.	J								U			48.	J				
4-Chloroaniline	106-47-8										U								
Hexachlorobutadiene	87-68-3										U								
4-Chloro-3-methylphenol	59-50-7										U							43.	J
2-Methylnaphthalene(V)	91-57-6										U								
Hexachlorocyclopentadiene	77-47-4										U								
2,4,6-Trichlorophenol	88-06-2										U								
2,4,5-Trichlorophenol	95-95-4										U								
2-Chloronaphthalene(V)	91-58-7										U								
2-Nitroaniline	88-74-4										U								
Dimethylphthalate	131-11-3										U								
Acenaphthylene(V)	208-96-8										U								
2,6-Dinitrotoluene	606-20-2										U								
3-Nitroaniline	99-09-2										U								
Acenaphthene(V)	83-32-9	140.	J								U	45.	J	130.	J			69.	J
2,4-Dinitrotoluene	121-14-2										U								
2,4-Dinitrophenol	51-28-5										U								
4-Nitrophenol(V)	100-02-7										U								
Dibenzofuran	132-64-9	51.	J								U			55.	J				
Diethylphthalate	84-66-2										U								
4-Chlorophenyl phenyl ether	7005-72-3										U								
Fluorene(V)	86-73-7	110.	J								U	39.	J	120.	J				
4-Nitroaniline	100-01-6										U								
4,6-Dinitro-2-methylphenol(V)	534-52-1										U								
n-Nitrosodiphenylamine(V)	86-30-6										U								
4-Bromophenyl phenyl ether	101-55-3										U								
Hexachlorobenzene	118-74-1										U								
Pentachlorophenol	87-86-5										U								
Phenanthrene(V)	85-01-8	560.		94.	J	220.	J	220.	J		U	260.	J	630.	*	130.	J	210.	J
Anthracene(V)	120-12-7	170.	J								U	63.	J	200.	J			50.	J
Di-n-butylphthalate	84-74-2										U								
Fluoranthene	206-44-0	530.		140.	J	210.	J	210.	J		U	300.	J	620.	*	150.	J	210.	J
Pyrene	129-00-0	470.		130.	J	220.	J	190.	J		U	290.	J	600.	*	140.	J	240.	J
Butylbenzylphthalate	85-68-7										U								
3,3-Dichlorobenzidine	91-94-1										U								
Benzo(a)anthracene	56-55-3	200.	J	62.	J	91.	J	92.	J		U	120.	J	260.	J	58.	J	85.	J
Chyrsene	218-01-9	220.	J	76.	J	120.	J	100.	J		U	150.	J	330.	J	62.	J	94.	J
bis(2-Ethylhexyl)phthalate	117-81-7										U			350.	J				
Di-n-octylphthalate	117-84-0										U								
Benzo(b)fluoranthene	205-99-2	180.	J	79.	J	90.	J	86.	J		U	100.	J	210.	J	40.	J	250.	J
Benzo(k)fluoranthene	207-08-9	220.	J	52.	J	110.	J	110.	J		U	160.	J	340.	J	79.	J	78.	J
Benzo(a)pyrene	50-32-8	250.	J	84.	J	110.	J	120.	J		U	160.	J	350.	J	64.	J	96.	J
Indeno(1,2,3-cd)pyrene	193-39-5	170.	J	55.	J	67.	J				U	93.	J	190.	J			58.	J
Dibenz(a,h)anthracene	53-70-3	86.	J			67.	J				U			110.	J				
Benzo(g,h,i)perylene	191-24-2	170.	J	61.	J	90.	J	90.	J		U	100.	J	200.	J	40.	J	73.	J

APPENDIX C

Building 123 Subsurface Soils

Semivolatile Organic Compounds - Detects Only

RIN / Borehole / Depth (ft)		5145-007.004 27-5 0-5		5145-008.004 28-6 0-6		5145-009.004 29-7 0-6		5145-010.004 30-8 0-6		5163-001.004 31-9 0-6		5163-002.004 32-10 0-5		5163-003.004 33-11 0-6		5163-004.004 34-12 0-5.4		5163-005.004 35-13 0-5.1		5163-006.004 36-14 0-6	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Phenol	108-95-2					65.	J									50.59	J				
bis(2-Chloroethyl)ether(V)	111-44-4																				
2-Chlorophenol(V)	95-57-8					68.	J									52.32	J				
1,3-Dichlorobenzene(V)	541-73-1																				
1,4-Dichlorobenzene(V)	106-46-7																				
Benzyl Alcohol	100-51-6																				
1,2-Dichlorobenzene(V)	95-50-1																				
2-Methylphenol	95-48-7																				
bis(2-Chloroisopropyl)ether(V)	108-60-1																				
4-Methylphenol	106-44-5																				
n-Nitrosodipropylamine	621-64-7																				
Hexachloroethane	67-72-1																				
Nitrobenzene(V)	98-95-3																				
Isophorone	78-59-1																				
2-Nitrophenol	88-75-5																				
2,4-Dimethylphenol(V)	105-67-9																				
Benzoic Acid	65-85-0	220.	JB	220.	JB	220.	JB	230.	JB	230.	JB	210.	JB	236.75	J	214.98	J	220.09	J	228.35	J
bis(2-Chloroethoxy)methane(V)	111-91-1																				
2,4-Dichlorophenol	120-83-2																				
1,2,4-Trichlorobenzene(V)	120-82-1																				
Naphthalene(V)	91-20-3	49.	J																		
4-Chloroaniline	106-47-8																				
Hexachlorobutadiene	87-68-3																				
4-Chloro-3-methylphenol	59-50-7	38.	J			58.	J									41.53	J				
2-Methylnaphthalene(V)	91-57-6																				
Hexachlorocyclopentadiene	77-47-4																				
2,4,6-Trichlorophenol	88-06-2																				
2,4,5-Trichlorophenol	95-95-4																				
2-Chloronaphthalene(V)	91-58-7																				
2-Nitroaniline	88-74-4																				
Dimethylphthalate	131-11-3																				
Acenaphthylene(V)	208-96-8																				
2,6-Dinitrotoluene	606-20-2																				
3-Nitroaniline	99-09-2																				
Acenaphthene(V)	83-32-9	150.	J	37.	J																
2,4-Dinitrotoluene	121-14-2																				
2,4-Dinitrophenol	51-28-5																				
4-Nitrophenol(V)	100-02-7	60.	J			49.	J									196.19	J				
Dibenzofuran	132-64-9	42.	J																		
Diethylphthalate	84-66-2																				
4-Chlorophenyl phenyl ether	7005-72-3																				
Fluorene(V)	86-73-7	100.	J																		
4-Nitroaniline	100-01-6																				
4,6-Dinitro-2-methylphenol(V)	534-52-1																				
n-Nitrosodiphenylamine(V)	86-30-6																				
4-Bromophenyl phenyl ether	101-55-3																				
Hexachlorobenzene	118-74-1																				
Pentachlorophenol	87-86-5	36.	J																		
Phenanthrene(V)	85-01-8	710.		210.	J									51.84	J						
Anthracene(V)	120-12-7	190.	J	44.	J																
Di-n-butylphthalate	84-74-2			25.	J											41.94	J				
Fluoranthene	206-44-0	760.		250.	J					38.	J			42.93	J						
Pyrene	129-00-0	800.		250.	J					38.	J			51.58	J						
Butylbenzylphthalate	85-68-7															37.62	J				
3,3-Dichlorobenzidine	91-94-1																				
Benzo(a)anthracene	56-55-3	320.	J	110.	J																
Chyrsene	218-01-9	340.	J	130.	J																
bis(2-Ethylhexyl)phthalate	117-81-7	47.	J	200.	J					43.	J	100.	J	141.04	J	138.07	J	141.19	J	150.95	J
Di-n-octylphthalate	117-84-0																				
Benzo(b)fluoranthene	205-99-2	420.		280.	J					200.	J			122.08	J						
Benzo(k)fluoranthene	207-08-9	290.	J	100.	J																
Benzo(a)pyrene	50-32-8	380.		130.	J									302.35	J						
Indeno(1,2,3-cd)pyrene	193-39-5	190.	J	73.	J																
Dibenz(a,h)anthracene	53-70-3	89.	J	69.	J																
Benzo(g,h,i)perylene	191-24-2	250.	J	99.	J																

APPENDIX C
Building 123 Subsurface Soils
Semivolatile Organic Compounds - Detects Only

RIN		5163-007.004		5163-008.004		5163-009.004		5163-010.004		5178-001.004		5178-006.004		5178-002.004		5178-003.004		5178-004.004		5178-005.004	
Borehole		37-15		38-16		39-17		40-18		41-19		42-20		43-21		44-22		45-23		46-24	
Depth (ft)		0-6		0-6		0-6		0-6		0-6		0-6		0-6		0-6		0-6		0-6	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Phenol	108-95-2										U								U		
bis(2-Chloroethyl)ether(V)	111-44-4										U								U		
2-Chlorophenol(V)	95-57-8			39.	J						U								U		
1,3-Dichlorobenzene(V)	541-73-1										U								U		
1,4-Dichlorobenzene(V)	106-46-7										U								U		
Benzyl Alcohol	100-51-6										U								U		
1,2-Dichlorobenzene(V)	95-50-1										U								U		
2-Methylphenol	95-48-7										U								U		
bis(2-Chloroisopropyl)ether(V)	108-60-1										U								U		
4-Methylphenol	106-44-5										U								U		
n-Nitrosodipropylamine	621-64-7										U								U		
Hexachloroethane	67-72-1										U								U		
Nitrobenzene(V)	98-95-3										U								U		
Isophorone	78-59-1										U								U		
2-Nitrophenol	88-75-5										U								U		
2,4-Dimethylphenol(V)	105-67-9										U								U		
Benzoic Acid	65-85-0	225.19	J			130.	J	140.	J		U			130.	J	140.	J		U		
bis(2-Chloroethoxy)methane(V)	111-91-1										U								U		
2,4-Dichlorophenol	120-83-2										U								U		
1,2,4-Trichlorobenzene(V)	120-82-1										U								U		
Naphthalene(V)	91-20-3										U								U		
4-Chloroaniline	106-47-8										U								U		
Hexachlorobutadiene	87-68-3										U								U		
4-Chloro-3-methylphenol	59-50-7										U								U		
2-Methylnaphthalene(V)	91-57-6										U								U		
Hexachlorocyclopentadiene	77-47-4										U								U		
2,4,6-Trichlorophenol	88-06-2										U								U		
2,4,5-Trichlorophenol	95-95-4										U								U		
2-Chloronaphthalene(V)	91-58-7										U								U		
2-Nitroaniline	88-74-4										U								U		
Dimethylphthalate	131-11-3										U								U		
Acenaphthylene(V)	208-96-8										U								U		
2,6-Dinitrotoluene	606-20-2										U								U		
3-Nitroaniline	99-09-2										U								U		
Acenaphthene(V)	83-32-9										U								U		
2,4-Dinitrotoluene	121-14-2										U								U		
2,4-Dinitrophenol	51-28-5										U								U		
4-Nitrophenol(V)	100-02-7										U								U		
Dibenzofuran	132-64-9										U								U		
Diethylphthalate	84-66-2										U								U		
4-Chlorophenyl phenyl ether	7005-72-3										U								U		
Fluorene(V)	86-73-7										U								U		
4-Nitroaniline	100-01-6										U								U		
4,6-Dinitro-2-methylphenol(V)	534-52-1										U								U		
n-Nitrosodiphenylamine(V)	86-30-6										U								U		
4-Bromophenyl phenyl ether	101-55-3										U								U		
Hexachlorobenzene	118-74-1										U								U		
Pentachlorophenol	87-86-5										U								U		
Phenanthrene(V)	85-01-8										U								U	118.9	J
Anthracene(V)	120-12-7										U								U		
Di-n-butylphthalate	84-74-2										U								U		
Fluoranthene	206-44-0										U								U	113.17	J
Pyrene	129-00-0										U	37.72	J						U	117.29	J
Butylbenzylphthalate	85-68-7										U								U		
3,3-Dichlorobenzidine	91-94-1										U								U		
Benzo(a)anthracene	56-55-3										U								U	47.03	J
Chyrsene	218-01-9										U								U	60.07	J
bis(2-Ethylhexyl)phthalate	117-81-7										U								U		
Di-n-octylphthalate	117-84-0										U								U		
Benzo(b)fluoranthene	205-99-2										U								U	82.48	J
Benzo(k)fluoranthene	207-08-9										U								U		
Benzo(a)pyrene	50-32-8										U								U	59.73	J
Indeno(1,2,3-cd)pyrene	193-39-5										U								U	36.59	J
Dibenz(a,h)anthracene	53-70-3										U								U		
Benzo(g,h,i)perylene	191-24-2										U								U	46.27	J

APPENDIX C

Building 123 Subsurface Soils

Semivolatile Organic Compounds - Detects Only

RIN		5178-006.004		5178-007.004	
Borehole		47-25		48-26	
Depth (ft)		0-6		0-6	
Analyte	CAS No.	Result (ug/Kg)	Qualifier	Result (ug/Kg)	Qualifier
Phenol	108-95-2				
bis(2-Chloroethyl)ether(V)	111-44-4				
2-Chlorophenol(V)	95-57-8				
1,3-Dichlorobenzene(V)	541-73-1				
1,4-Dichlorobenzene(V)	106-46-7				
Benzyl Alcohol	100-51-6				
1,2-Dichlorobenzene(V)	95-50-1				
2-Methylphenol	95-48-7				
bis(2-Chloroisopropyl)ether(V)	108-60-1				
4-Methylphenol	106-44-5				
n-Nitrosodipropylamine	621-64-7				
Hexachloroethane	67-72-1				
Nitrobenzene(V)	98-95-3				
Isophorone	78-59-1				
2-Nitrophenol	88-75-5				
2,4-Dimethylphenol(V)	105-67-9				
Benzoic Acid	65-85-0	209.27	J	186.23	J
bis(2-Chloroethoxy)methane(V)	111-91-1				
2,4-Dichlorophenol	120-83-2				
1,2,4-Trichlorobenzene(V)	120-82-1				
Naphthalene(V)	91-20-3				
4-Chloroaniline	106-47-8				
Hexachlorobutadiene	87-68-3				
4-Chloro-3-methylphenol	59-50-7				
2-Methylnaphthalene(V)	91-57-6				
Hexachlorocyclopentadiene	77-47-4				
2,4,6-Trichlorophenol	88-06-2				
2,4,5-Trichlorophenol	95-95-4				
2-Chloronaphthalene(V)	91-58-7				
2-Nitroaniline	88-74-4				
Dimethylphthalate	131-11-3				
Acenaphthylene(V)	208-96-8				
2,6-Dinitrotoluene	606-20-2				
3-Nitroaniline	99-09-2				
Acenaphthene(V)	83-32-9				
2,4-Dinitrotoluene	121-14-2				
2,4-Dinitrophenol	51-28-5				
4-Nitrophenol(V)	100-02-7				
Dibenzofuran	132-64-9				
Diethylphthalate	84-66-2				
4-Chlorophenyl phenyl ether	7005-72-3				
Fluorene(V)	86-73-7				
4-Nitroaniline	100-01-6				
4,6-Dinitro-2-methylphenol(V)	534-52-1				
n-Nitrosodiphenylamine(V)	86-30-6				
4-Bromophenyl phenyl ether	101-55-3				
Hexachlorobenzene	118-74-1				
Pentachlorophenol	87-86-5				
Phenanthrene(V)	85-01-8				
Anthracene(V)	120-12-7				
Di-n-butylphthalate	84-74-2				
Fluoranthene	206-44-0				
Pyrene	129-00-0				
Butylbenzylphthalate	85-68-7				
3,3-Dichlorobenzidine	91-94-1				
Benzo(a)anthracene	56-55-3				
Chyrsene	218-01-9				
bis(2-Ethylhexyl)phthalate	117-81-7			89.25	J
Di-n-octylphthalate	117-84-0				
Benzo(b)fluoranthene	205-99-2				
Benzo(k)fluoranthene	207-08-9				
Benzo(a)pyrene	50-32-8				
Indeno(1,2,3-cd)pyrene	193-39-5				
Dibenz(a,h)anthracene	53-70-3				
Benzo(g,h,i)perylene	191-24-2				

Appendix D

Building 123 Subsurface Soils - Metals Results

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5067-001.021		98A5080-001.002		98A5080-002.002		98A5080-003.002		98A5080-004.002		98A5080-005.002		98A5080-006.002	
Borehole		1		2		3		4		5		6		7	
Sample Depth (ft)		0-5.8		0-6		0-6		0-6		0-6		0-5.8		0-6	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	9,910.		22,700.		5,830.		9,430.		12,600.		13,000.		5,710.	
Antimony	7440-36-0	1.7	U	1.9	U	1.6	U	1.6	U	1.7	U	1.8	U	1.6	U
Arsenic	7440-38-2	6.	B	8.3	B	5.3	B	6.7	B	7.	B	9.7	B	5.7	B
Barium	7440-39-3	65.7		78.9		34.		51.3		58.2		73.8		36.4	
Beryllium	7440-41-7	.8		1.6		.64		.73		.86		1.1		.52	
Cadmium	7440-43-9	.11	B	.1	B	.17	B	.11	B	.28	B	.19	B	.17	B
Calcium	7440-70-2	2,760.		2,790.		1,480.		1,840.		5,790.		3,940.		3,510.	
Chromium	7440-47-3	13.6		14.7		7.2		10.4		15.7		14.		7.5	
Cobalt	7440-48-4	6.2	B	9.3	B	4.1	B	2.9	B	3.6	B	6.3	B	3.4	B
Copper	7440-50-8	9.9		7.4		6.4		6.3		8.4		9.8		9.6	
Iron	7439-89-6	12,300.		15,200.		7,890.		9,810.		11,700.		14,300.		8,810.	
Lead	7439-92-1	10.5	B	11.7	B	7.2	B	8.1	B	18.1		14.1		12.	
Lithium	7439-93-2	6.7	B	8.6	B	3.8	B	5.3	B	6.9	B	8.3	B	5.	B
Magnesium	7439-95-4	1,660.		1,350.		798.	B	1,060.		1,450.		1,400.		1,320.	
Manganese	7439-96-5	214.		58.2		77.8		66.6		70.7		82.2		97.7	
Mercury	7439-97-6	.04	U	.04	U	.04	U	.03	U	.04	U	.04	U	.03	U
Molybdenum	7439-98-7	2.2	B	.68	B	.62	B	.51	B	1.1	B	.87	B	.58	B
Nickel	7440-02-0	11.7		13.8		7.8	B	7.8	B	10.7		12.4		7.3	B
Potassium	7440-09-7	950.	B	848.	B	604.	B	850.	B	1,090.		1,190.		786.	B
Selenium	7782-49-2	.43	U	.47	U	.41	U	.4	U	.42	U	.44	U	.41	U
Silver	7440-22-4	.13	U	.31	B	.12	U	.12	U	.13	U	.13	U	.12	U
Sodium	7440-23-5	217.	B	508.	B	182.	B	154.	B	146.	B	196.	B	400.	B
Strontium	7440-24-6	12.6	B	19.7	B	9.9	B	14.7	B	20.2	B	19.7	B	14.7	B
Thallium	7440-28-0	.45	B	.46	U	.4	U	.4	B	.43	B	.43	U	.4	U
Tin	7440-31-5	1.6	B	2.2	B	1.4	B	1.6	B	2.6	B	2.2	B	1.6	B
Uranium	7440-62-2	.67	U	.74	U	.65	U	.64	U	.66	U	.66	U	.62	U
Vanadium	7440-62-2	29.1		35.8		19.4		27.		31.9		37.6		22.8	
Zinc	7440-66-6	24.5		18.3		22.		15.5		32.7		25.7		28.3	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5080-007.002		98A5080-008.002		98A5080-009.002		98A5110-001.002		98A5110-002.002		98A5110-003.002		98A5110-004.002	
Borehole		8		9		10		11		12		13		14	
Sample Depth (ft)		0-5.7		0-6		0-5.2		0-5		0-5.6		0-5		0-4	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	10,100.		9,330.		8,480.		6,640.		6,810.		5,460.		8,560.	
Antimony	7440-36-0	1.8	U	1.7	U	1.6	U	.29	B	.19	U	.19	U	1.7	U
Arsenic	7440-38-2	6.5	B	6.9	B	6.1	B	3.7	B	5.	B	4.9	B	7.7	B
Barium	7440-39-3	57.8		54.3		46.8		58.9		62.9		40.		53.2	
Beryllium	7440-41-7	1.		.7		.67		.44		.55		.6		.78	
Cadmium	7440-43-9	.03	U	.15	B	.11	B	.03	U	.03	U	.03	U	.03	U
Calcium	7440-70-2	3,130.		2,180.		2,230.		3,470.		1,940.		2,000.		1,700.	
Chromium	7440-47-3	11.2		20.3		10.6		13.5		10.9		9.7		10.6	
Cobalt	7440-48-4	5.9	B	3.2	B	5.1	B	4.6	B	7.8	B	4.6	B	3.8	B
Copper	7440-50-8	9.7		11.5		8.2		16.5		14.		10.2		7.3	
Iron	7439-89-6	12,900.		10,800.		10,700.		12,100.		11,100.		9,890.		11,000.	
Lead	7439-92-1	12.6		11.5		10.7		9.6	B	8.4	B	7.4	B	9.1	B
Lithium	7439-93-2	6.5	B	6.	B	6.8	B	9.6	B	6.4	B	5.1	B	6.1	B
Magnesium	7439-95-4	1,710.		1,260.		1,350.		2,870.		2,090.		1,320.		952.	B
Manganese	7439-96-5	95.		99.4		109.		206.		203.		136.		84.4	
Mercury	7439-97-6	.05	B	.04	U	.05	B	.03	U	.03	U	.03	U	.04	B
Molybdenum	7439-98-7	.53	B	2.8	B	.65	B	1.4	B	.84	B	.95	B	.56	B
Nickel	7440-02-0	10.4		10.9		9.7		9.		8.9		7.5	B	10.	
Potassium	7440-09-7	1,090.	B	797.	B	855.	B	1,610.		1,580.		848.	B	755.	B
Selenium	7782-49-2	.48	B	.42	U	.41	U	.41	U	.42	U	.42	U	.58	B
Silver	7440-22-4	.13	U	.13	U	.12	U	.12	U	.13	U	.13	U	.12	U
Sodium	7440-23-5	255.	B	288.	B	201.	B	263.	B	333.	B	190.	B	291.	B
Strontium	7440-24-6	17.8	B	23.7	B	13.1	B	21.6	B	9.6	B	15.8	B	13.5	B
Thallium	7440-28-0	.43	U	.42	B	.4	U	.76	B	.81	B	.82	B	.39	U
Tin	7440-31-5	2.	B	1.7	B	1.5	B	1.	B	1.1	B	.86	B	1.4	B
Uranium	7440-62-2	.68	U	.65	U	.65	U	.64	U	.66	U	.65	U	.62	U
Vanadium	7440-62-2	30.6		25.5		25.3		23.3		24.7		22.6		31.	
Zinc	7440-66-6	28.3		20.9		24.5		34.5		30.5		20.7		20.2	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5110-005.002		98A5110-006.002		98A5110-007.002		98A5110-008.002		98A5110-009.002		98A5110-010.002		98A5145-001.002	
Borehole		15		16		17		18		19		20		21	
Sample Depth (ft)		0-4.5		0-5		0-5.4		0-6		0-5.7		0-6		0-4	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	2,550.		10,200.		11,600.		9,930.		8,100.		10,300.		2,530.	
Antimony	7440-36-0	1.8	U	1.9	U	1.9	U	3.1	B	2.	B	4.	B	1.7	U
Arsenic	7440-38-2	2.8	B	9.7	B	8.1	B	6.2	B	7.6	B	8.3	B	2.	B
Barium	7440-39-3	21.9		92.3		102.		87.3		85.5		63.2		27.1	
Beryllium	7440-41-7	.29		.98		1.		.73		.8		1.5		.23	
Cadmium	7440-43-9	.17	B	.03	U	.05	B	.03		.08	B	.55	B	.09	B
Calcium	7440-70-2	420.		22,500.		2,850.		10,100.	B	3,950.		2,850.		3,080.	
Chromium	7440-47-3	3.1		10.2		13.9	B	18.1		12.6		9.5		7.6	
Cobalt	7440-48-4	2.8	B	6.	B	4.3		6.1	B	4.4	B	11.	B	1.9	B
Copper	7440-50-8	1.9	B	6.		12.5		13.7		9.9		11.4		5.6	
Iron	7439-89-6	4,200.		9,140.		13,800.		15,700.		11,400.		20,300.		4,570.	
Lead	7439-92-1	3.4	B	8.2	B	16.8	B	13.3		16.4		10.7	B	22.7	
Lithium	7439-93-2	3.9	B	7.5	B	8.6		11.3	B	6.9	B	5.9	B	3.5	U
Magnesium	7439-95-4	596.	B	1,720.		1,330.		3,250.		1,220.		1,010.	B	671.	B
Manganese	7439-96-5	50.5		72.2		104.	B	212.		177.		167.		84.3	
Mercury	7439-97-6	.03	U	.04	U	.07	B	.04	U	.04	U	.05	B	.03	U
Molybdenum	7439-98-7	.2	B	.65	B	.47		.79	B	.67	B	.92	B	.69	B
Nickel	7440-02-0	7.9	B	10.9		10.9		12.9		8.1	B	13.4		3.8	B
Potassium	7440-09-7	139.	B	1,040.	B	2,980.	U	1,990.		1,140.		556.	B	545.	B
Selenium	7782-49-2	.42	U	.46	B	.45	B	.43	U	.64	B	.89	B	.41	U
Silver	7440-22-4	.21	B	.13	U	.18	B	.13	U	.18	B	.14	U	.12	U
Sodium	7440-23-5	229.	B	363.	B	1,020.	B	361.	B	286.	B	316.	B	278.	B
Strontium	7440-24-6	4.7	B	35.2	B	19.1	U	49.3		20.3	B	15.3	B	11.4	B
Thallium	7440-28-0	.41	U	.43	U	.44	B	.41	U	.42	U	.44	U	.4	U
Tin	7440-31-5	1.2	B	1.2	B	1.8	B	1.5	B	1.4	B	1.9	B	1.9	B
Uranium	7440-62-2	.65	U	.69	U	.7	U	.66	U	.67	U	1.3	B	.64	U
Vanadium	7440-62-2	12.4		20.5		33.8		33.6		27.7		54.6		10.3	
Zinc	7440-66-6	8.6		18.8		36.1		43.		26.6		29.		19.3	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5145-002.002		98A5145-003.002		98A5145-004.002		98A5145-005.002		98A5145-006.002		98A5145-007.002		98A5145-008.002	
Borehole		22		23-1		24-2		25-3		26-4		27-5		28-6	
Sample Depth (ft)		0-6		0-5.6		0-6		0-6		0-6		0-5		0-6	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	6,770.		6,500.		6,330.		11,500.		8,350.		11,600.		4,530.	
Antimony	7440-36-0	2.6	B	3.1	B	2.9	B	4.6	B	2.9	B	3.8	B	2.7	B
Arsenic	7440-38-2	5.9	B	7.1	B	5.6	B	6.	B	7.3	B	6.	B	3.1	B
Barium	7440-39-3	46.9		42.1		42.2		74.4		46.8		64.7		30.9	
Beryllium	7440-41-7	.75		.76		.61		.87		.81		.81		.38	
Cadmium	7440-43-9	.03	U	.03	U	.69	B	.03	U	.03	U	.04	B	.03	U
Calcium	7440-70-2	1,850.		2,620.		1,930.		2,850.		3,940.		4,980.		4,460.	
Chromium	7440-47-3	9.6		19.3		9.4		20.8		13.8		11.6		7.4	
Cobalt	7440-48-4	4.1	B	7.7	B	4.2	B	5.6	B	7.6	B	11.6		7.	B
Copper	7440-50-8	8.4		12.8		8.2		14.4		10.6		13.8		6.7	
Iron	7439-89-6	10,200.		11,800.		10,100.		15,300.		12,300.		15,300.		8,570.	
Lead	7439-92-1	8.4	B	6.4	B	8.2	B	13.1		16.7		10.5	B	4.7	B
Lithium	7439-93-2	6.1	B	5.7	B	4.8	B	9.2	B	7.	B	8.8	B	4.8	B
Magnesium	7439-95-4	1,270.		1,090.		845.	B	1,750.		1,270.		1,720.		905.	B
Manganese	7439-96-5	111.		181.		106.		234.		153.		227.		123.	
Mercury	7439-97-6	.04	U	.04	U	.06	B	.08	B	.04	U	.03	U	.03	U
Molybdenum	7439-98-7	.98	B	5.4	B	.89	B	4.6	B	.74	B	.51	B	.51	B
Nickel	7440-02-0	8.1	B	8.	B	9.		10.4		10.7		10.6		5.2	B
Potassium	7440-09-7	893.	B	941.	B	648.	B	1,750.		1,110.	B	1,640.		837.	B
Selenium	7782-49-2	.7	B	.43	U	.43	U	.5	B	.45	U	.43	U	.44	U
Silver	7440-22-4	.13	U	.13	U	.13	U	.13	U	.14	B	.13	U	.13	U
Sodium	7440-23-5	286.	B	163.	B	164.	B	180.	B	312.	B	333.	B	287.	B
Strontium	7440-24-6	10.6	B	12.7	B	14.8	B	5.7	B	20.	B	17.7	B	10.7	B
Thallium	7440-28-0	.42	U	.42	U	.42	U	.42	U	.44	U	.42	U	.43	U
Tin	7440-31-5	1.4	B	1.1	B	1.4	B	1.8	B	1.2	B	1.3	B	1.5	B
Uranium	7440-62-2	.67	U	.67	U	.67	U	.67	U	.7	U	.66	U	.69	U
Vanadium	7440-62-2	24.6		25.1		23.2		31.5		30.6		32.4		17.7	
Zinc	7440-66-6	25.		24.5		17.9		38.3		30.5		42.3		26.7	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5145-009.002		98A5145-010.002		98A5163-001.002		98A5163-002.002		98A5163-003.002		98A5163-004.002		98A5163-005.002	
Borehole		29-7		30-8		31-9		32-10		33-11		34-12		35-13	
Sample Depth (ft)		0-6		0-6		0-6		0-5		0-6		0-5.4		0-5.1	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	11,000.		9,040.		16,300.		8,060.		16,000.		3,080.		6,900.	
Antimony	7440-36-0	1.9	U	3.9	B	3.9	B	2.4	B	.21	U	.19	U	.21	U
Arsenic	7440-38-2	8.1	B	8.	B	9.5	B	8.5	B	10.2	B	3.1	B	5.1	B
Barium	7440-39-3	54.9		49.7		80.1		46.2		86.2		95.5		45.6	
Beryllium	7440-41-7	1.2		.87		1.7		.82		1.3		.36		.82	
Cadmium	7440-43-9	.03	U	.03	U	.03	U	.03	U	.03	U	.03	U	.04	U
Calcium	7440-70-2	8,010.		5,750.		3,910.		1,560.		4,710.		1,470.		2,060.	
Chromium	7440-47-3	10.8		10.6		16.2		11.2		17.2		5.1		12.	
Cobalt	7440-48-4	5.4	B	5.7	B	15.9		6.4	B	7.8	B	21.1		5.4	B
Copper	7440-50-8	7.2		6.2		6.8		7.5		10.7		6.8		7.1	
Iron	7439-89-6	11,500.		10,500.		15,800.		11,500.		16,200.		5,110.		8,710.	
Lead	7439-92-1	5.9	B	6.5	B	10.6		14.3		12.		3.6	B	6.2	B
Lithium	7439-93-2	6.9	B	6.1	B	6.9	B	5.3	B	10.4	B	3.7	U	4.	B
Magnesium	7439-95-4	1,410.		1,150.		1,610.		951.	B	2,140.		715.	B	1,100.	B
Manganese	7439-96-5	58.9		78.1		89.3		79.5		124.		67.7		92.6	
Mercury	7439-97-6	.04	U	.07	B	.1	B	.08	B	.49		.04	B	.04	U
Molybdenum	7439-98-7	1.1	B	.83	B	.57	B	1.1	B	.66	B	.61	B	2.2	B
Nickel	7440-02-0	11.9		10.4		14.3		9.7		17.2		4.9	B	9.	B
Potassium	7440-09-7	950.	B	796.	B	797.	B	741.	B	1,360.		509.	B	756.	B
Selenium	7782-49-2	.45	U	.46	U	.61	B	.41	U	.75	B	.43	U	.77	B
Silver	7440-22-4	.14	U	.14	U	.56	B	.2	B	.14	U	.13	U	.14	U
Sodium	7440-23-5	365.	B	278.	B	301.	B	257.	B	176.	B	142.	B	142.	B
Strontium	7440-24-6	18.	B	15.2	B	21.	B	12.7	B	26.1	B	8.4	B	13.5	B
Thallium	7440-28-0	.44	U	.45	U	.41	U	.4	U	1.	B	.42	U	.53	B
Tin	7440-31-5	1.4	B	1.6	B	1.7	B	1.3	B	1.1	B	.78	B	.87	B
Uranium	7440-62-2	.7	U	.71	U	.66	U	.64	U	.72	U	.67	U	.73	U
Vanadium	7440-62-2	30.7		28.6		39.4		30.5		38.7		10.3		21.4	
Zinc	7440-66-6	19.9		13.3		16.8		16.		32.7		15.1		16.2	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN Borehole Sample Depth (ft)		98A5163-006.002 36-14 0-6		98A5163-007.002 37-15 0-6		98A5163-008.002 38-16 0-6		98A5163-009.002 39-17 0-6		98A5163-010.002 40-18 0-6		98A5178-001.002 41-19 0-6		98A5178-008.002 42-20 0-6	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	7,180.		4,180.		7,220.		2,510.		8,270.		6,930.		14,300.	
Antimony	7440-36-0	.19	U	.2	U	2.3	B	3.	B	3.7	B	2.4	B	6.7	B
Arsenic	7440-38-2	3.8	B	3.	B	3.	B	1.5	B	7.6	B	2.5	B	14.	B
Barium	7440-39-3	48.2		38.7		42.1		71.6		52.8		39.2		84.9	
Beryllium	7440-41-7	.58		.34		.66		.26		.99		.64		1.3	
Cadmium	7440-43-9	.05	B	.62	B	.25	B	.03	U	.03	U	.03	U	.06	U
Calcium	7440-70-2	3,460.		2,140.		1,890.		1,640.		2,060.		1,590.		1,780.	
Chromium	7440-47-3	7.7		5.4		8.5		4.4		11.4		7.5		36.	
Cobalt	7440-48-4	6.	B	9.1	U	4.	B	13.3		9.5	B	1.9	B	6.6	B
Copper	7440-50-8	10.4		14.4	B	7.8		12.3		7.		4.4	B	11.7	
Iron	7439-89-6	8,750.		7,310.		8,720.		7,440.		11,700.		7,030.		19,000.	
Lead	7439-92-1	9.3	B	8.8		17.2		3.6	B	7.5	B	3.7	B	24.2	
Lithium	7439-93-2	5.8	B	5.	B	4.9	B	7.	B	5.2	B	4.1	B	9.5	B
Magnesium	7439-95-4	1,590.		1,050.	B	1,260.		980.	B	1,130.		989.	B	1,120.	B
Manganese	7439-96-5	140.		119.	B	88.8		120.		139.		37.4		121.	
Mercury	7439-97-6	.04	U	.04		.04	B	.03	U	.05	B	.05	B	.	B
Molybdenum	7439-98-7	.23	B	.41	B	.81	B	3.1	B	1.2	B	.37	B	3.2	B
Nickel	7440-02-0	7.4	B	5.1	B	6.8	B	4.	B	12.3		5.06	B	17.2	
Potassium	7440-09-7	1,350.		1,090.	B	937.	B	1,190.		741.	B	527.	B	966.	B
Selenium	7782-49-2	.43	U	.45	U	.42	U	.41	U	75.	B	.44	U	.94	B
Silver	7440-22-4	.13	U	1.8		.13	U	.12	U	.13	U	.13	U	.22	U
Sodium	7440-23-5	190.	B	197.	B	253.	B	242.	B	284.	B	119.	B	541.	B
Strontium	7440-24-6	14.4	B	11.2	B	12.	B	9.3	B	14.6	B	11.5	B	13.7	B
Thallium	7440-28-0	.42	B	.44	U	.41	U	.4	U	.43	U	.43	U	.73	U
Tin	7440-31-5	.74	B	1.	B	1.2	B	1.3	B	1.2	B	1.6	B	2.3	B
Uranium	7440-62-2	.66	U	.7	U	.65	U	.63	U	.68	U	.68	U	1.2	U
Vanadium	7440-62-2	16.		11.2		15.8		9.9		30.8		12.8		54.5	
Zinc	7440-66-6	27.1		28.		17.6		21.7		12.8		9.5		39.5	

APPENDIX D
Building 123 Subsurface Soils
Metal Results

RIN		98A5178-002.002		98A5178-003.002		98A5178-004.002		98A5178-005.002		98A5178-006.002		98A5178-007.002	
Borehole		43-21		44-22		45-23		46-24		47-25		48-26	
Sample Depth (ft)		0-6		0-6		0-6		0-6		0-6		0-6	
Analyte	CAS No.	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier	Result (mg/Kg)	Qualifier
Aluminum	7429-90-5	2,240.		8,520.		4,240.		10,600.		19,000.		5,720.	
Antimony	7440-36-0	1.7	B	2.5	B	3.5	B	3.7	B	6.	B	4.6	B
Arsenic	7440-38-2	1.9	B	6.2	B	3.1	B	6.7	B	10.4	B	2.3	B
Barium	7440-39-3	14.1	B	58.8		34.5		91.1		101.		45.9	
Beryllium	7440-41-7	.26		1.		.42		.86		1.6		.39	
Cadmium	7440-43-9	.11	B	.03	U	1.2		.05	U	.06	U	.05	U
Calcium	7440-70-2	599.	B	4,400.		1,660.		3,250.		1,940.		2,940.	
Chromium	7440-47-3	4.6		11.5		9.7		33.4		21.4		7.4	
Cobalt	7440-48-4	2.4	B	5.2	B	6.	B	7.	B	7.1	B	12.7	B
Copper	7440-50-8	2.7	B	7.6		6.8		19.3		13.3		13.5	
Iron	7439-89-6	3,690.		10,900.		7,880.		17,300.		21,800.		10,200.	
Lead	7439-92-1	3.5	B	7.7	B	14.7		17.5		122.		5.7	B
Lithium	7439-93-2	3.4	U	5.2	B	6.1	B	11.4	B	11.4	B	14.4	B
Magnesium	7439-95-4	441.	B	1,320.		1,090.		2,340.		2,070.		2,620.	
Manganese	7439-96-5	38.1		103.		106.		220.		138.		199.	
Mercury	7439-97-6	.04	B	.04	B	.03	U	.00	B	.00	U	.00	U
Molybdenum	7439-98-7	.55	B	.7	B	1.1	B	8.2	B	1.1	B	.49	B
Nickel	7440-02-0	4.3	B	10.2		6.	B	13.2	B	18.5		7.2	B
Potassium	7440-09-7	237.	B	870.	B	800.	B	2,160.		1,830.	B	1,750.	
Selenium	7782-49-2	.52	B	.45	U	.41	U	.69	U	.91	B	.68	U
Silver	7440-22-4	.12	U	.13	U	.12	U	.21	U	.82	B	.2	U
Sodium	7440-23-5	56.7	U	179.	B	142.	B	245.	B	9,750.		479.	B
Strontium	7440-24-6	3.6	B	21.1	B	9.4	B	19.3	B	15.1	B	12.1	B
Thallium	7440-28-0	.39	U	.44	U	.4	U	.67	U	.79	U	.66	U
Tin	7440-31-5	.45	U	1.	B	1.4	B	2.5	B	3.1	B	2.1	B
Uranium	7440-62-2	.62	U	.7	U	.64	U	1.1	U	1.3	U	1.	U
Vanadium	7440-62-2	8.2		28.6		15.		33.3		49.2		13.8	
Zinc	7440-66-6	6.9		14.5		18.4		46.9		28.3		32.7	

Appendix E

Building 123 Subsurface Soils - Nitrate Results

APPENDIX E
Building 123 Subsurface Soils
Nitrate Results

Borhole	Depth (ft)	Rin No.	Analyte	Result (mg/Kg)	Qualifer
1	0-5.8	98A5067-001.021	Nitate/Nitrite as N	1.	U
2	0-6	98A5080-001.009	Nitate/Nitrite as N	.28	B
3	0-6	98A5080-002.009	Nitate/Nitrite as N	.1	U
4	0-6	98A5080-003.009	Nitate/Nitrite as N	.11	B
5	0-6	98A5080-004.009	Nitate/Nitrite as N	.1	U
6	0-5.8	98A5080-005.009	Nitate/Nitrite as N	.41	B
7	0-6	98A5080-006.009	Nitate/Nitrite as N	.54	
8	0-5.7	98A5080-007.009	Nitate/Nitrite as N	.1	U
9	0-6	98A5080-008.009	Nitate/Nitrite as N	.13	B
10	0-5.2	98A5080-009.009	Nitate/Nitrite as N	.1	U
11	0-5	98A5110-001.005	Nitate/Nitrite as N	1.	U
12	0-5.6	98A5110-002.005	Nitate/Nitrite as N	1.2	
13	0-5	98A5110-003.005	Nitate/Nitrite as N	1.	U
14	0-4	98A5110-004.005	Nitate/Nitrite as N	1.04	
15	0-4.5	98A5110-005.005	Nitate/Nitrite as N	3.17	
16	0-5	98A5110-006.005	Nitate/Nitrite as N	1.49	
17	0-5.4	98A5110-007.005	Nitate/Nitrite as N	11.5	
18	0-6	98A5110-008.005	Nitate/Nitrite as N	1.95	
19	0-5.7	98A5110-009.005	Nitate/Nitrite as N	1.78	
20	0-6	98A5110-010.005	Nitate/Nitrite as N	1.	U
21	0-4	98A5145-001.005	Nitate/Nitrite as N	1.2	
22	0-6	98A5145-002.005	Nitate/Nitrite as N	1.4	
23-1	0-5.6	98A5145-003.005	Nitate/Nitrite as N	2.2	
24-2	0-6	98A5145-004.005	Nitate/Nitrite as N	1.6	
25-3	0-6	98A5145-005.005	Nitate/Nitrite as N	3.8	
26-4	0-6	98A5145-006.005	Nitate/Nitrite as N	7.9	
27-5	0-5	98A5145-007.005	Nitate/Nitrite as N	5.3	
28-6	0-6	98A5145-008.005	Nitate/Nitrite as N	3.9	
29-7	0-6	98A5145-009.005	Nitate/Nitrite as N	2.7	
30-8	0-6	98A5145-010.005	Nitate/Nitrite as N	16.2	
31-9	0-6	98A5163-001.005	Nitate/Nitrite as N	8.98	
32-10	0-5	98A5163-002.005	Nitate/Nitrite as N	66.6	
33-11	0-6	98A5163-003.005	Nitate/Nitrite as N	3.3	
34-12	0-5.4	98A5163-004.005	Nitate/Nitrite as N	7.8	
35-13	0-5.1	98A5163-005.005	Nitate/Nitrite as N	6.2	
36-14	0-6	98A5163-006.005	Nitate/Nitrite as N	3.7	
37-15	0-6	98A5163-007.005	Nitate/Nitrite as N	10.	
38-16	0-6	98A5163-008.005	Nitate/Nitrite as N	4.5	
39-17	0-6	98A5163-009.005	Nitate/Nitrite as N	1.9	
40-18	0-6	98A5163-010.005	Nitate/Nitrite as N	2.98	
41-19	0-6	98A5178-001.005	Nitate/Nitrite as N	2.39	
42-20	0-6	98A5178-008.005	Nitate/Nitrite as N	39.6	
43-21	0-6	98A5178-002.005	Nitate/Nitrite as N	15.9	
44-22	0-6	98A5178-003.005	Nitate/Nitrite as N	1.56	
45-23	0-6	98A5178-004.005	Nitate/Nitrite as N	52.9	
46-24	0-6	98A5178-005.005	Nitate/Nitrite as N	24.4	
47-25	0-6	98A5178-006.005	Nitate/Nitrite as N	14.5	
48-26	0-6	98A5178-007.005	Nitate/Nitrite as N	38.8	

Appendix F

Building 123 Actual Sample Location

Survey Elevation Points

Building 123 Actual Sample Location Survey Elevation Points

Description	Northing	Easting	Elevation
1	749247.7	2081785.7	6029.7
2	749173.9	2081772.4	6033.4
3	749126.3	2081800.2	6031.1
4	749146.5	2081784.5	6032.2
5 approx.	749144.9	2081772.7	6033.8
6	749048.7	2081785.2	6033.0
7	749070.5	2081792.2	6032.4
8	749101.3	2081776.9	6032.7
9	749014.8	2081754.9	6033.1
10	749028.1	2081732.0	6033.8
11	749050.3	2081663.9	6034.5
12	748994.6	2081682.4	6034.3
13	749082.1	2081682.4	6035.3
14	749065.4	2081611.8	6034.8
15	749113.6	2081610.4	6034.9
16	749165.0	2081605.6	6035.2
17	749199.6	2081607.4	6035.5
18	749232.3	2081688.2	6033.6
19	749231.4	2081725.5	6033.3
20	749117.4	2081713.0	6035.1
21	749127.2	2081682.7	6035.3
22	749004.0	2081608.6	6035.6
23-1	749087.6	2081658.9	6035.6
24-2	749100.0	2081658.1	6035.6
25-3	749112.3	2081657.4	6035.6
26-4	749095.7	2081657.2	6035.6
27-5	749138.8	2081658.0	6035.6
28-6	749147.3	2081654.7	6035.5
29-7	749202.1	2081621.9	6035.5
30-8	749202.9	2081625.3	6035.5
31-9	749194.9	2081630.3	6035.5
32-10	749187.6	2081642.4	6035.5
33-11	749171.6	2081653.2	6035.6
34-12	749214.6	2081659.8	6035.6
35-13	749206.4	2081680.1	6035.6
36-14	749213.7	2081680.8	6035.6
37-15	749217.2	2081696.5	6035.6
38-16	749214.8	2081699.6	6035.6
39-17	749208.2	2081723.0	6035.5
40-18	749175.7	2081724.8	6035.5
41-19	749164.6	2081724.9	6035.6
42-20	749181.0	2081701.9	6035.5
43-21	749189.5	2081765.5	6035.6
44-22	749169.7	2081765.7	6035.5
45-23	749142.3	2081765.6	6035.5

Project: 123 Boreholes
Survey: 08/06/98

Coordinate Listing (State Plane)

46-24	749062.5	2081721.4	6035.6
47-25	749096.1	2081728.2	6035.4
48-26	749131.7	2081738.5	6035.6

Appendix G

Radionuclide Precision Evaluation Results

Radionuclide Precision Evaluation Results

QC Sample ID	Location	Media	Detected Analyte	QC Sample Type	Associated Real Sample ID	QC Result	Q	QC Result Error	Real Results	Q	Real Result Error	DER Value
98A5110-011	BH 20	Soil	Americium-241	Dup	98A5110-010	3.10E-04	U	1.22E-02	9.32E-03	U	1.53E-02	0.46
			Curium-243/244			1.55E-02	U	2.15E-02	3.10E-02	U	2.87E-02	0.43
			Plutonium-239/240			0.00E+00	U	0.00E+00	4.07E-02	U	4.30E-02	0.95
			Plutonium-242			3.96E-02	J	3.88E-02	1.90E-02	U	3.07E-02	0.42
			Strontium-89/90			-1.09E-01	U	1.57E-01	-1.22E-01	U	1.97E-01	0.05
			Uranium-232			-1.27E-03	U	4.53E-03	2.78E-02	U	2.98E-02	0.96
			Uranium-233/234			5.68E-01	J	1.15E-01	8.40E-01	U	1.62E-01	1.37
			Uranium-235			4.88E-02	J	3.41E-02	2.24E-02	U	2.66E-02	0.61
			Uranium-238			7.72E-01	J	1.34E-01	6.62E-01	J	1.44E-01	0.56
98A5110-011	BH 30-8	Soil	Americium-241	Dup	98A5163-010	-5.22E-03	NA	9.19E-03	2.83E-03	NA	1.28E-02	0.51
			Curium-243/244			5.36E-03	NA	1.98E-02	1.93E-02	NA	2.18E-02	0.47
			Plutonium-239/240			2.00E-02	NA	3.75E-02	-1.12E-02	NA	1.55E-02	0.77
			Plutonium-242			-2.21E-02	NA	1.64E-02	1.21E-02	NA	4.83E-02	0.67
			Uranium-232			5.04E-03	NA	1.27E-02	-1.91E-04	NA	2.34E-03	0.41
			Uranium-233/234			5.66E-01	NA	1.26E-01	5.01E-01	NA	7.83E-02	0.44
			Uranium-235			7.32E-03	NA	1.43E-02	2.88E-02	NA	1.88E-02	0.91
			Uranium-238			4.73E-01	NA	1.15E-01	5.37E-01	NA	8.13E-02	0.45
98A5163-011	BH 40-18	Soil	Americium-241	Dup	98A5163-010	2.37E-02	U	2.69E-02	8.60E-03	U	1.69E-02	0.48
			Curium-243/244			2.92E-02	U	3.16E-02	6.99E-03	U	1.37E-02	0.64
			Plutonium-239/240			-5.40E-03	U	1.06E-02	1.85E-02	U	2.95E-02	0.76
			Plutonium-242			-1.62E-02	U	1.83E-02	-5.04E-03	U	6.99E-03	1.03
			Strontium-89/90			-3.46E-02	U	1.95E-01	-3.20E-01	U	1.71E-01	1.10
			Uranium-232			6.55E-03	U	1.29E-02	-2.93E-03	U	7.97E-03	0.63
			Uranium-233/234			7.69E-01	J	1.33E-01	8.14E-01	J	1.51E-01	0.22
			Uranium-235			3.61E-02	J	2.88E-02	3.32E-02	U	3.09E-02	0.07
			Uranium-238			7.72E-01	J	1.34E-01	9.22E-01	J	1.61E-01	0.72

Appendix H

Volatile and Semi-Volatile Organics

Precision Evaluation Results

Volatile and Semi Volatile Organics Precision Evaluation Results

QC Sample ID	Location	Media	Detected Analyte	QC Sample Type	Associated Real Sample ID	QC Results	Q	Real Results	Q	RPD Value (%)
98A5110-011.004	BH 20	Soil	Phenanthrene	Dup	98A5110-010-004	660		94	J	150
			Fluoranthrene			150		140	J	7
			Pyrene			540		130	J	122
			Vols- Not Available							
98A5145-010.003	BH 30-8	Soil	Volatiles	Dup		All	U	All	U	NA
			Semi-Vols			All	U	All	U	NA
98A5163-011.003	BH 40-14	Soil	Trichloroethene	Dup	98A5163-010.003	3.50	J	5.23		40
			Semi-Vols			All	U	All	U	NA

Attachment 1

Actual Soil Sampling Locations/Borehole Map

Attachment 2

Common Data Qualifiers

Table 14 - Common Data Qualifiers

Qualifier	Description
A	This annotation is utilized to indicate that a TIC is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.
B	This qualifier is used when the analyte is found in the associated blank and in the sample. It indicates possible or probable blank contamination and warns the data user to use caution when applying the results of this analyte.
BQL	Below Quantitation Limit (BQL) indicates the compound was not detected in the sample above the practical quantitation limit.
C	Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.
D	Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.
E	Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.
J	Indicates an estimated value. This is used either when estimating a concentration for TICs or when mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.
MDL	The Method Detection Limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero.
ND	Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.
PQL	The Practical Quantitation Limit (PQL) is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.
U	Indicates the compound was analyzed for, but was not detected in, the sample above the applicable quantitation limit.

Attachment 19

ER Ranking

Attachment 20

Radiological Characterization Information

for the Building 123 Slab

2/100

Attachment 20
RF/RMRS-98-253.UN

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RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-125.UN

INFORMATION ONLY

Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab

Rocky Flats Environmental Technology Site

Prepared by

Rocky Mountain Remediation Services, L. L. C.

December 1997

CONCRETE SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE THE BUILDING 123 SLAB

DECEMBER 1997

This Sampling and Analysis Plan has been reviewed and approved by:

John Miller, Radiological Engineering	12-17-97 Date
Gary Konwinski, Environmental Management	12-17-97 Date
Mark Brooks, RMRS Quality Assurance	12-17-97 Date
Greg Sollner, K-H Compliance and Performance Assurance	12-17-97 Date
C.L. Guthrie, RMRS Project Management	12/17/97 Date

This Sampling and Analysis Plan was prepared by:

Kirk K. Hilbelink, Project Scientist	12-17-97 Date

TABLE OF CONTENTS

ACRONYMS v

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs) vi

1.0 INTRODUCTION 1
1.1 Purpose 1
1.2 Background 1
1.2.1 Physical Description 1
1.2.1.1 Source Pits 1
1.2.1.1 Floor Drains 1
1.2.1.3 Secondary Containment Sumps/ Access Pits 3
1.2.1.4 Process Waste Pump Sumps 4
1.2.2 Building Operating History 4
1.2.2.1 Source Pits 4
1.2.2.2 Floor Drains 4
1.2.2.3 Secondary Containment Sumps/ Access Pits 5
1.2.2.4 Process Waste Pump Sumps 5

2.0 CONTAMINANTS OF CONCERN 5

3.0 DATA QUALITY OBJECTIVES 6

4.0 SAMPLING ACTIVITIES 8
4.1 Sample Location and Frequency 8
4.2 Sample Designation 9
4.3 Site Preparation 9
4.4 Sample Collection 11
4.5 Personal Protective Equipment (PPE) 12
4.6 Sample Handling and Analysis 12

5.0 DATA MANAGEMENT 12

6.0 QUALITY ASSURANCE 12

7.0 SCHEDULE 13

8.0 ADDITIONAL ACTIVITIES 13
8.1 Abandonment of Coreholes 13
8.2 Slab Remediation 13
8.3 Disposition of Waste 13

9.0 REFERENCES 13

Tables

Table 1.2 Summary of Radiological Survey Results above Unrestricted Release Limits 5

Table 3.0 Analysis Methods, Method Detection Limits and Unrestricted Release Levels for Contaminants of Concern at Building 123. 7

TABLE OF CONTENTS (cont)

FIGURES

Figure 1.1 Building 123 Site Location 2

Figure 1.2 Location of Abandoned Floor Drains and Pits in Building 123 3

Figure 4.1 Concrete Sampling Locations 10

ACRONYMS

AHA .... Activity Hazard Analysis
ANSI ...... American National Standards Institute
APO .... Analytical Projects Office
Ba .... barium
COCs ..... contaminants of concern
Cf .... californium
CDPHE .... Colorado Department of Public Health and the Environment
DQO ...... Data Quality Objective
DOE ...... U.S. Department of Energy
dpm .... disintegrations per minute
EPA .... U.S. Environmental Protection Agency
GPR .... Ground-Penetrating Radar
Gd .... gadolinium
H-3 .... tritium
HASP ...... Health and Safety Plan
HTO ...... tritium oxide
LLW .... low-level waste
MDA .... minimum detectable activity
Ni .... nickel
NIST ...... National Institute of Standards and Technology
OPWL ..... Original Process Waste Line
PAM .... Proposed Action Memorandum
Pb .... lead
PPE .... personal protective equipment
PRE .... Property Release Evaluation
QA/QC .... Quality Assurance/Quality Control
QAPD ..... Quality Assurance Program Description
RCRA ..... Resource Conservation and Recovery Act
RCT .... Radiological Control Technician
RFCA ...... Rocky Flats Cleanup Agreement
RFETS ..... Rocky Flats Environmental Technology Site
RMMA ..... Radioactive Materials Management Area
RMRS ..... Rocky Mountain Remediation Services
RWP ...... Radiological Work Permit
SAA .... Satellite Accumulation Area
SOPs ..... Standard Operating Procedures
SAP .... Sampling and Analysis Plan
Sr .... strontium
TLD .... thermoluminescent dosimeter
UCL .... Upper Confidence Limit

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs)

Identification Number	Procedure Title
4-ROI-03.02	*Radiological Requirements for Unrestricted Release*
1-P21-HSP-18.04	*Control of Radioactive Sources*
4-U50-REP-1006	*Radiological Characterization of Bulk or Volume Materials*
4-Q97-REP-1003	*Radiological Evaluation for Unrestricted Release of Property/Waste*
1-P73-HSP-18.10	*Radioactive Material Transfer and Unrestricted Release of Property and Waste*
5-21000-OPS-FO.03	*General Equipment Decontamination, Section 5.3.1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field*
OPS-DIR-006	*Safety Requirements for Work Involving Penetration of Walls, Floors Ceilings, and Concrete, Asphalt, or Masonry Pads*
2-S47-ER-ADM-05.15	*Use of Field Logbooks and Forms*
RM-06.04	*Administrative Record Document Identification and Control*
5-21000-OPS-FO.10	*Receiving, Labeling, and Handling Environmental Containers*
5-21000-OPS-FO.13	*Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*

CONCRETE SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE THE BUILDING 123 SLAB

INFORMATION ONLY

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide a Sampling and Analysis (SAP) for the radiological characterization of the Building 123 concrete slab, pursuant to the *Proposed Action Memorandum (PAM) for the Decommissioning of Building 123* (RMRS 1997a).

The objective of the SAP is to define specific data needs, sampling and analysis requirements, data handling procedures, and associated project QA/QC requirements to demonstrate that residual radioactive materials existing in the Building 123 slab are below levels appropriate for unrestricted release with respect to 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials*. If necessary, areas will be decontaminated, managed as radioactive material, or released in a restricted manner. The SAP defines activities that will occur in conjunction with efforts outlined in the *Close-out Radiological Survey Plan for the Building 123 Cluster* (RMRS, 1997b). All work will be performed in accordance with the *RMRS Quality Assurance Program Description(QAPD)*(RMRS 1997c).

1.2 Background

1.2.1 Physical Description

Building 123 is located on Central Avenue between Third and Fourth Streets at the Rocky Flats Environmental Technology Site (RFETS, Figure 1.1). Building 123 was erected in 1953 with additions completed in 1968, 1972 and 1989. The 75-room facility covers approximately 19,000 square feet and is constructed of mostly concrete with an asphalt roof. The floor slab is composed of poured-in-place, reinforced concrete, six to eight inches thick, with a barrier on a gravel base (RMRS 1997d).

1.2.1.1 Source Pits

Cylindrical, concrete lined pits were installed during the original construction for the storage of radioactive sources for dosimetry. Three different types of pits were constructed as described below and indicated in Figure 1.2:

1. Type A: approximately 18' deep x 19" diameter
2. Type B: 16" deep x 12" diameter
3. Type D: 8" deep x 6" diameter

1.2.1.2 Floor Drains

Floor drains were installed to divert liquid process waste through OPWL P-2 to Building 374 for treatment (Figure 1.2).

1.2.1.3 Secondary Containment Sumps/Access Pits

Interconnected, secondary containment sumps/access pits for the process waste lines were

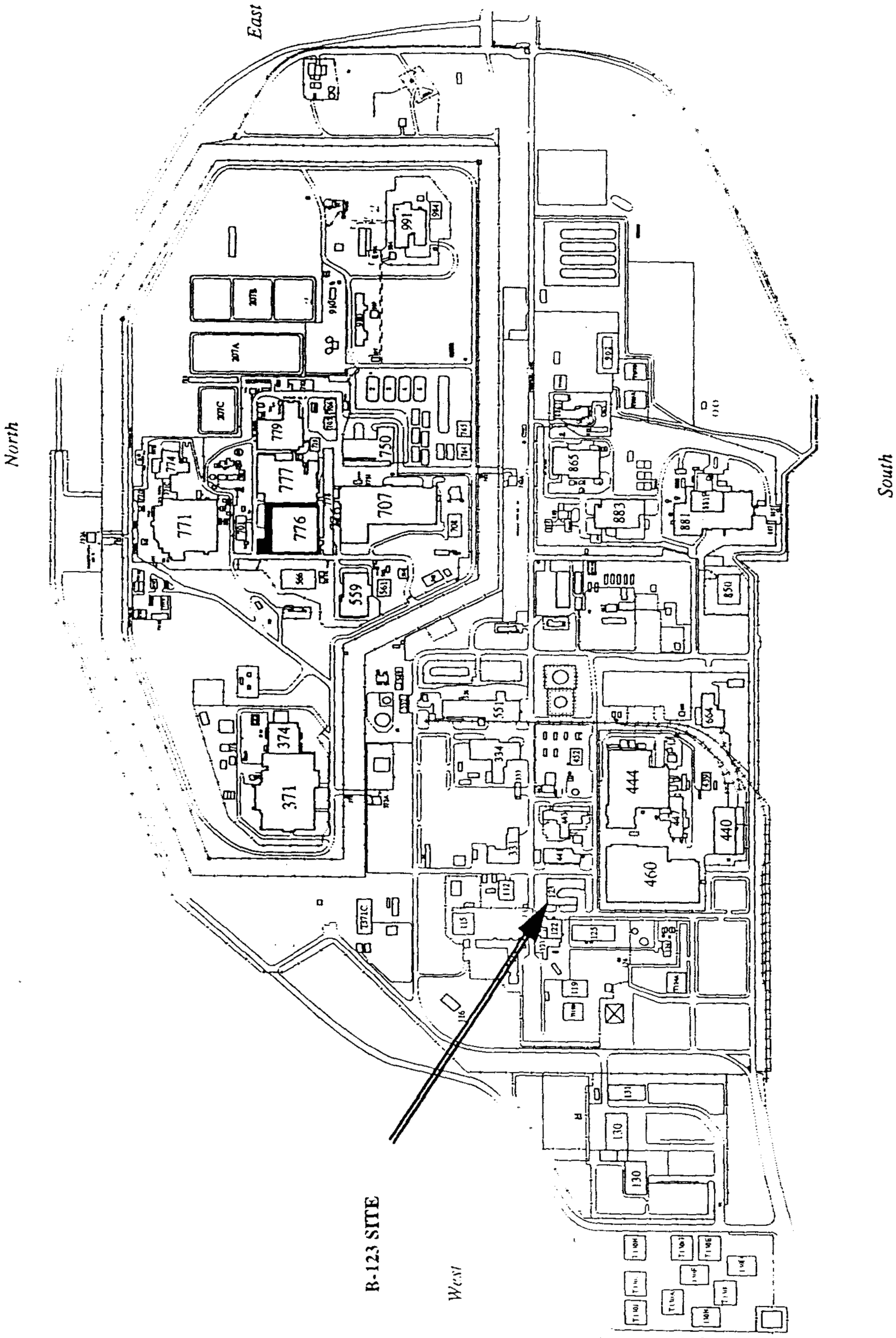

Figure 1.1 Building 123 Site Location

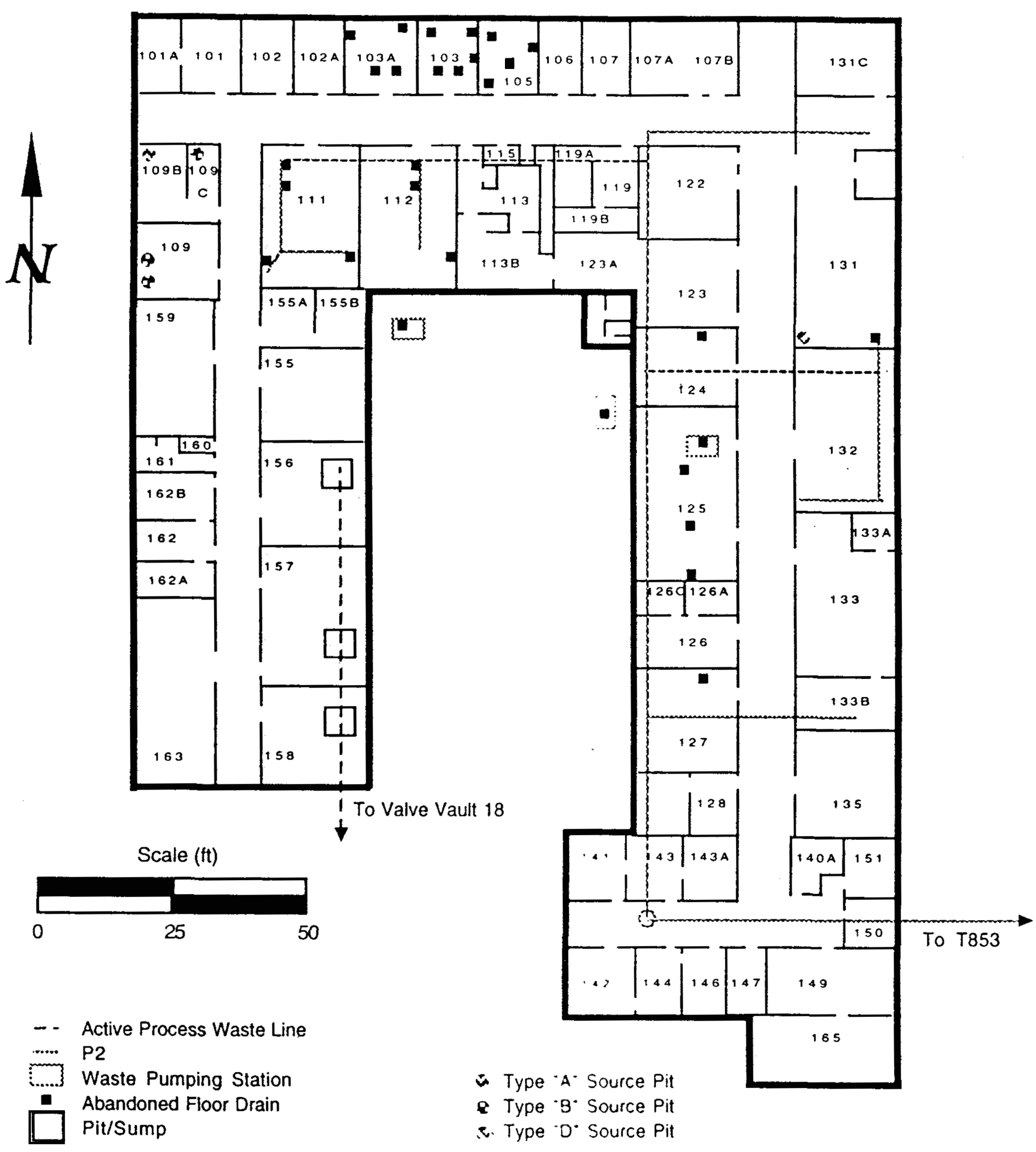

Figure 1.2 Locations of Abandoned Floor Drains and Pits in Building 123

installed in Rooms 156,157, and 158 during the 1972 west wing addition (see Figure 1.2).

Dimensions of the sumps are described below:

1. Room 156: 4' x 4' x 4'-2" deep
2. Room 157: 4' x 6' x 5' deep
3. Room 158: 4' x 4' x 5'-3" deep

Process waste exits the building from the sump in Room 158 through underground pipe P-1 to Valve Vault 18. The floor of all three sumps is 4" thick and the walls are 8" reinforced concrete. The sumps were coated with epoxy paint in approximately 1992.

1.2.1.4 Process Waste Pump Sumps

Three concrete sumps were installed in 1974 to house process waste pumps as part of the overhead process waste system. Two sumps were installed in the Building 123 courtyard and one sumps was installed in Room 124. Dimensions of the sumps are described below:

1. Waste Pumping Station P-5 (outside Room 125): approximately 4' x 3' x 2' deep
2. Waste Pumping Station P-6 (outside Room 112): approximately 4' x 3' x 2' deep
3. Waste Pumping Station P-1 (Room 124): 1'-11" x 1'-8" x 11" deep.

The floor of the sumps is 6" thick and the walls are 4" reinforced concrete. Each of the sumps are overlain by a quarter-inch-thick steel cover.

1.2.2 Building Operating History

Analytical laboratory, dosimetry and instrument calibration activities have been conducted in Building 123 since construction in 1953. Building 123 once housed medical research, generating approximately 95 percent of the building waste, until such operations were relocated to Building 122. The remaining five percent was generated through repair and calibration of radiation detection instruments and process of thermoluminescent dosimeters (TLDs) and film badges.

Analytical laboratory procedures involved the digestion of samples to purify and concentrate the radiological constituents. Sample preparation operations generated the bulk of the building waste. Combustibles, rubber gloves, and broken glass generated in the Radioactive Materials Management Areas (RMMAs) were placed in Satellite Accumulation Areas (SAAs) for eventual handling as low level waste (LLW). Various sample waste and rinse solutions were washed down the process drain for subsequent treatment in Building 774 (Building 374 after 1983). Various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm) were handled in Building 123.

1.2.2.1 Source Pits

Source pits were used to store radioactive sources for dosimetry activities. Prior to 1966 a spill of cesium-contaminated liquid occurred in the vicinity of one of the Type A pits in Room 109C. The pits were abandoned and filled with concrete in approximately 1970, just prior to construction of the west wing. No further action was initiated to address consequences of the spill.

1.2.2.2 Floor Drains

Floor drains concentrated in the north central area of Building 123 (Figure 1.2) directed liquid process wastes to the process waste system. Most of the drains fed to process waste pumps which pumped the wastes into the overhead process waste lines and eventually to underground line P-2. Other drains fed directly to P-2. When P-2 was properly abandoned in 1982, the floor drains were filled to the slab surface with concrete.

1.2.2.3 Secondary Containment Sumps/Access Pits

The secondary containment sumps/access pits in Rooms 156, 157, and 158 served as the final junction of process wastes before the wastes exit the building through underground line P-1. The pits are currently active and will be utilized until RCRA closure of the overhead process waste lines and active underground line P-1 has been completed.

1.2.1.4 Process Waste Pump Sumps

Sumps were installed to house process waste pumps which directed liquid process waste to line P-2. The pumps were decommissioned in 1974 and removed from the sumps, which are currently empty.

2.0 CONTAMINANTS OF CONCERN (COCs)

During the past forty-four years, building operations (primarily analytical laboratory operations) may have contributed, in varying degrees, to the deposition of radioactive contamination within the building. The presence of radioactive contamination above the unrestricted release criteria defined in 4-ROI-03.02, *Radiological Requirements for Unrestricted Release* was confirmed in Rooms 105, 106, 109 and 123A (Table 2.0) during reconnaissance-level characterization surveys

Table 2.0 Summary of Radiological Survey Results above Unrestricted Release Limits *(in dpm/100 cm^2)*[a]

Room Number	Removable		Total	
	Alpha	Beta	Alpha	Beta/Gamma
105 Spike and Electroplating Prep.	<18	<205	<60	124,200
106 Office	<18	<205	<60	1,101
109 Office	<18	<205	<60	9,072
123A Hall to Exit Lockers	<18	<205	<60	7,920

a The Unrestricted Release Limit for beta/gamma emitters is 1000 dpm/cm^2 (removable).

of the building. The potential for undetected residual radioactivity in excess of the release criteria varies throughout the building. Interviews with site employees indicated that a cesium spill occurred in Room 109, and undocumented thorium research was performed in Room 105. Scoping surveys conducted in May through July 1997 revealed elevated levels of radioactivity in both areas. The isotopic composition of the detected radioactivity was confirmed in a series of in-situ gamma spectroscopic measurements performed in August 1997. Based on the history of the building, most of the contamination was determined to be Thorium-232. Locations in Room 109 were determined to contain Cesium-137.

The following contaminants have been identified for Building 123:

- Pu-242, Pu-239, U-232, U-234, U-238, Am-241 and Cm-244; radioactive tracers used during bioassay analysis.
- Cs-137, spill, Room 109, confirmed via in-situ gamma spectroscopy.
- Th-232 and associated decay products, research and development Room 105, confirmed via in-situ gamma spectroscopy.

The following isotopes mentioned in the Reconnaissance Level Characterization Report for Building 123 have been ruled out as potential contaminants of concern:

- H-3, in the form of HTO in concentrations up to 1000 dpm/ml used as a standard for liquid scintillation analysis. A review of the *Historical Release Report for the Rocky Flats Plant*, (DOE 1992) and interviews with past building occupants failed to identify spills or releases involving tritium. If an undocumented spill had occurred, it is highly unlikely that residual tritium contamination would exceed the release criteria because the process of evaporation and relatively short half-life would limit the resulting contamination levels.
- H-3, in gaseous form is not expected to result in surface contamination.
- Ni-63, Sr-90, Ba-133, Gd-148 , Pb-210 and Cf-250 in the form of electroplated and sealed check sources. The integrity of electroplated and sealed sources are verified semi-annually in accordance with HSP 1-P21-HSP-18.04 *Control of Radioactive Sources* and are not expected to result in radioactivity contamination of the building.

3.0 DATA QUALITY OBJECTIVES

EPA has established a process to direct Superfund decision-making as the basis for developing DQOs. DQOs are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. The data must also facilitate appropriate remedial measures for mitigating risk. Data requirements to support this project were developed and are implemented in the project using criteria established in *Guidance for the Data Quality Objective Process*, QA/G-4 (EPA 1994).

The DQO process contains seven sequential steps which are rationalized below.

1. State the Problem

The problem is the uncertainty of the presence or absence of radioactive constituents in Building 123 concrete slab. The purpose of the SAP is to collect field data to identify and delineate the extent of any radioactive contamination to support unrestricted release of the building slab. Primary COCs are defined in Section 2.0.

2. Identify the Decision

The decision is to characterize the building slab and determine if all, none, or parts of the slab meet unrestricted release criteria defined in Step 3. All materials that do not meet the unrestricted release criteria, including concrete and associated rebar, conduit, and piping materials will be managed as radioactive waste.

3. Identify the Inputs to the Decision

The following information will be required to resolve the decision:

- Historical Information, including COCs defined in Section 2.0.
- Media Sampling (as outlined in Section 4.0)
- A radiological survey as defined in the *Close-out Radiological Survey Plan for the Building 123 Cluster* (RMRS, 1997b)

The sample frequency required to allow an unrestricted release relies heavily upon a judgmental sampling strategy, determined with respect to hand-held radiological survey results and process knowledge (see Section 4.1). Currently, no regulatory guidelines define release criteria for concrete material. Thus, direction will be derived from 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials,* which requires collection and analysis of one or more samples to represent background levels for a particular matrix and environment. A comparison is made of the background sample results with those of the remaining samples. Radiological Engineering personnel then evaluate the materials for disposal. If the remaining samples indicate no measurable increase in COCs, then the material may be released for unrestricted use under DOE Order 5400.5, *Radiation Protection of the Public and the Environment.* All statistical testing used to show that the waste is indistinguishable from background will be calculated based on sample results. Background sample location and frequency are discussed in Section 4.1.

COCs, analysis method names and method detection limits defined by the contract laboratory are indicated in Table 3.0.

Table 3.0 Analysis Methods, Method Detection Limits for Contaminants of Concern at Building 123.

Analyte	Method Name	Method Number	Method Detection Limit
U233	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U234	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U235	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U238	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
Pu239	Isotopics by Alpha Spectroscopy	Module RC01-B	0.3 pCi/g
Pu240	Isotopics by Alpha Spectroscopy	Module RC01-B	0.3 pCi/g
Th228, Th230, Cs137	Isotopics by Gamma Spectroscopy	a	1.0 pCi/g

[a] To date, no method number has been designated for gamma spectroscopy.

4. Define the Study Boundaries

The methodology contained in this document applies only to the Building 123 slab. Coring activities will occur only after normal working hours (after 1730) as not to impede asbestos strip-out and other decommissioning activities. The work is to be completed before demolition of Building 123.

5. Develop a Decision Rule

Data collected during this project will be evaluated by Radiological Engineering in accordance with 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials*. Exceedances of recommended allowable release limits will be evaluated for possible removal of parts or all of the slab.

6. Specify Tolerable Limits on Decision Errors

Sample locations were assigned according to areas defined in Section 4.1 to provide a thorough radiological characterization. In addition, error rates for data collected during this study are incorporated into the detection limits for the analysis parameters. Acceptable levels of decision errors will be used as the basis for establishing the quantity and quality of data needed to support the proper disposition of the Building 123 slab. Upper Confidence Limits (UCLs) will be calculated based on sample results.

7. Optimize the Design

During coring activities, an attempt will be made to ensure that actual sampling locations will closely correspond to the locations indicated in Figure 4.1. In the unlikely event that material other than concrete is encountered during coring activities, the sample location will be moved to a point within a six-inch radius of the original location, and the waste material will be disposed as specified in Section 8.2.

Data will be analyzed and evaluated by Radiological Engineering with respect to 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials*. Evaluation of sample analyses may warrant a source removal action or collection of additional samples. If required, the data will also be the basis for corrective measure design.

4.0 SAMPLING ACTIVITIES

4.1 Sample Location and Frequency

The sampling event will focus on the Building 123 concrete slab. Any locations outside of the building (i.e., waste pumping station sumps in the Building 123 courtyard) will be sampled as part of the soil sampling effort after the building has been demolished.

Thirty-eight (38) locations will be sampled; field duplicates will be collected at two of the locations to effect a total of forty (40) samples (see Section 4.4). Locations were determined with respect to *affected* and *unaffected* areas. *Affected* areas have potential radioactive contamination (based on historical reviews) or known radioactive contamination (based on results summarized in Table 2.0). Such areas include locations where radioactive materials were used and stored, where records indicate spills, or other unusual occurrences that could have resulted in the spread of contamination. Areas immediately surrounding or adjacent to locations where radioactive materials were used, stored, or spilled are included in this classification due to the potential for inadvertent spread of contamination. The investigation will focus on the following *affected* areas:

- immediately adjacent to locations of abandoned floor drains;
- locations of source pits; a sample will collected directly adjacent from the pit;
- within sumps/access pits; and
- areas of reported surface spills, including Room 109C;

All areas not classified as *affected* will be labeled *unaffected.* These areas are not expected to contain residual radioactivity, based on knowledge of site history, including room use and previous survey information. The following areas are considered to be *unaffected*:

- Rooms 101, 101A, 102, 102A, 107, 107A, 107B, 113, 113A, 113B, 115, 119, 119A, 119B, 122, 123, 123A, 126, 126A, 126C, 128, 131C, 132, 133, 133A, 133B, 135, 140A, 141, 142, 143, 143A, 144, 146, 147, 149, 150, 151, 155, 155A, 155B, 159, 160, 161, 162, 162A, 162B, 163, and 165; and
- All hallways.

The samples will be composed of concrete, with a diameter of one inch and cored to a depth of two inches. Two cores will be collected at each location to ensure that enough material is collected to properly analyze the samples for constituents defined in Section 4.6. Figure 4.1 indicates sample locations.

One background sample will be collected in Rooms 101A, 131C, and 135. The locations were selected based on the following process knowledge:

- the locations represent portions of the original slab;
- Rooms 101A, 131C, and 135 were used only as office areas since original construction of the building; and
- room-by-room radiological surveys indicated no radiological contamination above detection limits (see Section 2.0).

4.2 Sample Designation

The site standard sample numbering system will be implemented in this project. A simple, unique, alphanumeric location code will be assigned to each sample while in the field. The number will include the current year, building number, room number and sequential sample number (i.e. 97-B123-109C.1). Prior to sample collection, locations will be marked on the building slab with fluorescent spray paint. Sample numbers will be assigned to the project by the Rocky Flats Environmental Database System (RFEDS) Group. In preparation of the final report, a matrix will be developed to correlate the individual sample numbers to location codes.

4.3 Site Preparation

On December 11, 1997, all sample locations were marked with paint. On December 15 and 16

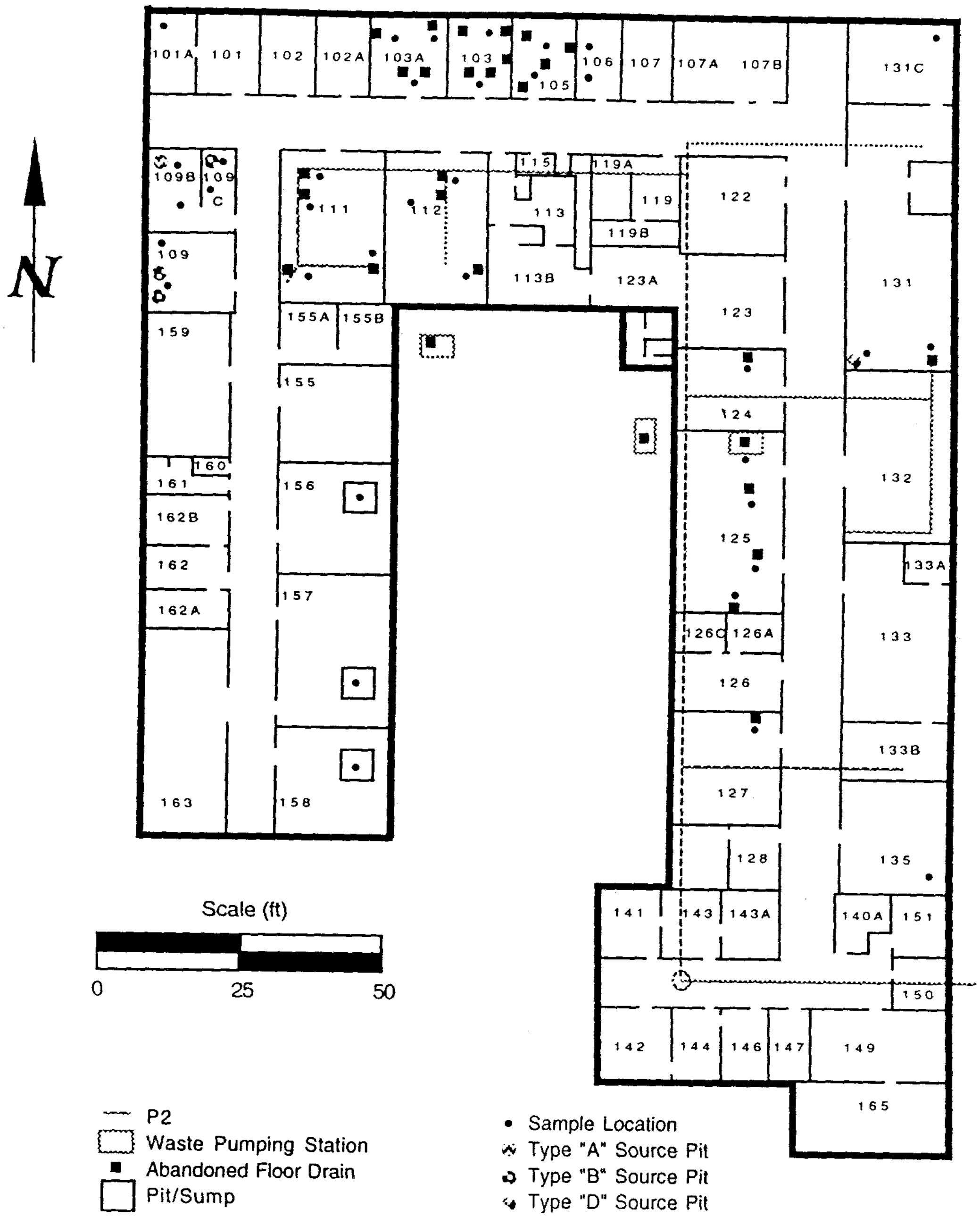

Figure 4.1 Concrete Sampling Locations

1997, a survey was conducted using a Ground-Penetrating Radar (GPR) which can indicate electrical conduit, piping, and rebar. The survey detected a layer of concrete reinforcement at approximately three to four inches below slab surface. The reinforcement is composed of rebar in an eight-inch to one-foot square grid pattern. In some cases the reinforcement was composed of a steel mesh. No evidence of rebar, electrical conduit or piping were detected at depths less than three inches.

An Activity Hazard Analysis (AHA) has been prepared to identify and address job-specific safety concerns specific to concrete sampling activities.

4.4 Sample Collection

Cores will be collected using the Hilty DD-100 Corer, a rotary-type, wet coring system. A portable, manually-pressurized container feeds water to the bit system, which includes a one-inch-diameter, diamond-impregnated core bit. The corer will be mounted on a portable stand which is held to the floor surface by vacuum pressure supplied by a vacuum pump. The slurry produced by coring will be contained by a slurry collection system used in conjunction with a wet/dry shop vacuum. Thus, little or no airborne emissions will be produced during coring activities. The instruction manual provided by the equipment manufacturer will be used to properly operate the drill. At each location, prior to coring activities, a 3-inch hole will be cut into a 3x3-foot sheet of visquine to be placed on the floor over the sample point. The visquine will aid in the cleanup of any waste produced by the core drill that is not collected by the wet/dry vacuum.

A minimum of 125g of material will be placed in a 4-ounce glass jar for gross alpha/gross beta screen; a minimum of 250g of material will be placed in an 8-ounce glass jar for the isotopics analyses. The sample jars will be labeled and handled according to OPS-FO.10 *Receiving, Labeling, and Handling Environmental Containers*.

An RCT will scan personnel, cores, and equipment with a portable Electra scintillation counter. The instrument will be calibrated and maintained in accordance with applicable instrumentation procedures listed in Section 6.0 of the *Rocky Flats Environmental Technology Site Radiological Operating Instructions* (DOE, 1997). Radioactive sources used for the purpose of calibration will be traceable to the National Institute of Standards and Technology (NIST).

Periodic checks of instrument response will be performed to assure that calibration and background have not changed. Following calibration, instrument response will be determined and acceptable range of response established. Instrument response tests will be performed and documented typically prior to beginning the daily measurements to assure continued acceptable operation. If the instrument response does not satisfy the established acceptable range, the instrument will be removed from service until the source of the deviation can be determined and resolved and acceptable response again demonstrated. If repair and/or recalibration is necessary, acceptable response ranges will be reestablished and documented.

Two field duplicates will be collected to represent at least five percent of the sample batch to provide adequate information on sample variability, as defined in *Guidance for Data Quality Objectives Process* (EPA 1994). Locations of duplicates will be determined in the field.

All reusable equipment will be decontaminated in accordance with 5-21000-OPS-FO.03, *General Equipment Decontamination, Section 5.3, Cleaning Procedures for Stainless Steel or Metal Sampling Equipment.* Health and safety requirements are specified in the *Building 123 Decommissioning Project Health and Safety Plan* (HASP, RMRS 1997e). Personal protective equipment (PPE) and air monitoring requirements, and hazard assessments not otherwise defined in the Building 123 PAM are addressed in the Building 123 HASP. Air monitoring requirements and hazard assessments not otherwise defined in the Building 123 PAM are addressed in the Building 123 HASP.

4.5 Personal Protective Equipment (PPE)

A graded approached will be employed when donning PPE. Level C PPE will initially be worn during coring activities and may be upgraded or downgraded under the direction of the RCT. PPE requirements are also defined in the associated AHA.

4.6 Sample Handling and Analysis

Samples will be handled according to *Environmental Management Department Operating Procedures Volume/ Field Operations*, OPS-FO.13, *Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*, and OPS-FO.10, *Receiving, Labeling, and Handling of Environmental Containers*. Samples will be hand-delivered to the Analytical Projects Office (APO), who will first submit the samples to the onsite laboratory for gross alpha/gross beta screens. The results will be reviewed by Radiological Engineering, who will determine if the samples can leave the site by comparing the results with the corresponding Minimum Detectable Activity (MDA) values. Radiological Engineering will evaluate the sample results for unrestricted release through a Property Release Evaluation (PRE). Upon approval, samples can then be submitted to an offsite, EPA-approved laboratory for analysis under a two-week result turnaround time. Samples will be analyzed for isotopic uranium and plutonium by alpha spectroscopy and for cesium and thorium by gamma spectroscopy.

5.0 DATA MANAGEMENT

A project field logbook will be created and maintained by the project manager or designee in accordance with 2-S47-ER-ADM-05.15 *Use of Field Logbooks and Forms*. The logbook will include time and date of all field activities, sketch maps of sample locations, or any additional information not specifically required by the SAP. The field logbook will also be used to document any unforseen event or necessary changes made to the SAP while in the field. The originator will legibly sign and date each completed original hard copy of data. A peer reviewer will examine each completed original hard copy of data. Any modifications will be indicated in ink, and initialed and dated by the reviewer. Logbooks will be controlled through document control.

Data for this project will be collected, entered, and stored in a secure, controlled, and retrievable environment in accordance with RM-06.04 *Administrative Record Document Identification and Control*. Results will be compiled into a sampling and analysis report. The expected percentage of characterization data validation required for the project is 25 percent. Location and analytical data will be entered into and stored in the Geographical Information System (GIS) files.

6.0 QUALITY ASSURANCE

Analytical data collected in support of this investigation will be evaluated using the guidance established by 2-G32-ER-ADM-08.02 *Evaluation of ERM Data for Usability in Final Reports*. This procedure establishes the guidelines for evaluating analytical data with respect to precision. accuracy, representativeness, completeness, and comparability (PARCC) parameters. For precision, the typical relative percent difference been samples and duplicates is less than or equal to 40% for solid media such as concrete or soil. Duplicates comprise at least 5% of the total sample batch. Accuracy is the responsibility of the laboratory. Comparability will be evaluated by comparing historical data with data collected during this event and will be followed in accordance to EPA regulations and Waste Acceptance Criteria, through which data will be validated. Completeness (90% of valid data) will be evaluated by comparing the SAP to the actual sampling episode.

7.0 SCHEDULE

Sample collection and analyses will be conducted before building demolition.

8.0 ADDITIONAL ACTIVITIES

8.1 Abandonment of Coreholes

The Building 123 slab is expected to remain in place following completion of demolition activities. All coreholes will be filled with a plug of non-shrinking bentonite slurry.

8.2 Slab Remediation

Remediation options are defined in Section 3.0 and in the *Close-Out Radiological Survey Plan for the Building 123 Cluster* (RMRS 1997b)

8.3 Disposition of Waste

Coring activities will generate approximately twenty gallons of slurry waste which may contain a combination of radioactive, hazardous and mixed wastes. Wastes consisting of asbestos-containing floor tiles, plastic, tools, PPE, and other materials associated with coring activities will also be a source of waste. Contaminated waste will be characterized and handled by a qualified waste generator who will support decontamination specialists and radiation control technicians to identify and segregate hazardous or low level waste. Drums or boxes will be provided by the Waste Disposal group. Waste packaging technicians will package and label the waste and arrange for radioactive waste to be certified. The Project Waste Coordinator will work with the certification personnel and prepare all required documentation. Liquid waste generated during decontamination of sampling and associated equipment will be flushed down an accessible process waste drain or collected in drums and shipped to Building 374 for processing. Solid waste will be managed by the Waste Disposal group and moved to a temporary staging area immediately adjacent to the site to be placed in rolloff containers until proper disposition is determined.

9.0 REFERENCES

DOE, 1997 *Rocky Flats Environmental Technology Site Radiological Operating Instructions* , March.

DOE 1996, *Rocky Flats Cleanup Agreement, Final.* July.

DOE 1992, *Historical Release Report for the Rocky Flats Plant.*

DOE Order 5400.5, *Radiation Protection of the Public and the Environment.*

EPA 1994, *Guidance for Data Quality Objectives Process*, EPA QA/G-4, September.

Gilbert 1987 *Statistical Methods for Environmental Pollution Monitoring.*

RMRS 1997a, *Proposed Action Memorandum for the Decommissioning of Building 123*, May.

RMRS 1997b, *Close-out Radiological Survey Plan for the Building 123 Cluster* , November.

RMRS 1997c, *RMRS Quality Assurance Program Description (QAPD).*

RMRS 1997d, *Reconnaissance Level Characterization Report for Building 123*, October.

RMRS 1997e, *Building 123 Decommissioning Project Health and Safety Plan*, June.

Rocky Flats

Sample QC Results Summary
3/16/98

Batch # : 117022, 117023, 117025, 117026
RIN 98A0621
Line Item Code: RC01B014, RC01B019
Matrix: Solid

	KHCO ID #	EPI ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
Rm 103 South	007.020	9802251-01	Plutonium-239/240	7.18E-01	3.62E-01	4.41E-01	0.30	24.65
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 103A NW Corner	012.035	9802251-02	Plutonium-239/240	3.93E-02	4.44E-02	3.55E-02	0.30	57.91
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 103A West Center	013.038	9802251-03	Plutonium-239/240	1.12E-01	1.64E-01	2.76E-01	0.30	19.24
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 103A SE Corner	014.041	9802251-04	Plutonium-239/240	2.75E-02	4.58E-02	8.19E-02	0.30	90.39
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 125 SW	018.053	9802251-05	Plutonium-239/240	6.32E-02	7.46E-02	1.14E-01	0.30	56.7
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 109A North	019.056	9802251-06	Plutonium-239/240	-1.34E-02	4.82E-02	1.34E-01	0.30	60.65
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 111 SW Corner	033.098	9802251-07	Plutonium-239/240	2.73E-02	3.78E-02	3.70E-02	0.30	58.66
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	

Rocky Flats

Sample QC Results Summary
3/16/98

Rm 111 SE Corner	003.008	9802251-08	Plutonium-239/240	1.53E-03	5.98E-02	1.35E-01	0.30	66.46
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 131 East	035.104	9802251-09	Plutonium-239/240	-5.31E-02	5.59E-02	1.55E-01	0.30	71.61
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 112 NE Corner	006.017	9802251-10	Plutonium-239/240	1.88E-02	3.68E-02	5.09E-02	0.30	38.68
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 131C	036.107	9802251-11	Plutonium-239/240	1.69E-02	5.44E-02	1.18E-01	0.30	48.16
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
R[illegible]24 East	032.095	9802251-12	Plutonium-239/240	-8.17E-02	6.05E-02	1.76E-01	0.30	63.21
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 112 NW Corner	005.014	9802251-13	Plutonium-239/240	-1.11E-02	5.76E-02	1.34E-01	0.30	69.91
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 112 SW Corner	004.011	9802251-14	Plutonium-239/240	2.55E-01	1.16E-01	1.40E-01	0.30	85.03
			Uranium 233/234				1.00	
			Uranium 235				1.00	
			Uranium 238				1.00	
Rm 135	001.002	9802321-01	Plutonium-239/240				0.30	
			Uranium 233/234	1.26E+00	2.72E-01	1.37E-01	1.00	101.54
			Uranium 235	5.90E-02	5.77E-02	3.99E-02	1.00	101.54
			Uranium 238	1.37E+00	2.80E-01	8.83E-02	1.00	101.54

Sample QC Results Summary
3/16/98

Rm 131 West	002.005	9802321-02	Plutonium-239/240				0.30	
			Uranium 233/234	1.27E+00	2.73E-01	1.25E-01	1.00	102.98
			Uranium 235	1.49E-01	9.87E-02	1.10E-01	1.00	102.98
			Uranium 238	1.08E+00	2.49E-01	8.92E-02	1.00	102.98
Rm 103 North	008.023	9802321-03	Plutonium-239/240				0.30	
			Uranium 233/234	5.84E-01	1.96E-01	1.57E-01	1.00	100.82
			Uranium 235	3.88E-02	6.66E-02	1.31E-01	1.00	100.82
			Uranium 238	6.93E-01	2.05E-01	9.36E-02	1.00	100.82
Rm 106 South	009.026	9802321-04	Plutonium-239/240				0.30	
			Uranium 233/234	9.93E-01	2.38E-01	1.42E-01	1.00	98.85
			Uranium 235	2.05E-01	1.08E-01	8.47E-02	1.00	98.85
			Uranium 238	9.58E-01	2.30E-01	1.04E-01	1.00	98.85
Rm 106 North	010.029	9802321-05	Plutonium-239/240				0.30	
			Uranium 233/234	1.35E+00	2.71E-01	1.03E-01	1.00	99.45
			Uranium 235	1.54E-01	9.07E-02	3.78E-02	1.00	99.45
			Uranium 238	1.31E+00	2.65E-01	3.78E-02	1.00	99.45
Rm 127	011.032	9802321-06	Plutonium-239/240				0.30	
			Uranium 233/234	1.86E+00	3.60E-01	1.02E-01	1.00	100.68
			Uranium 235	7.65E-02	7.63E-02	1.02E-01	1.00	100.68
			Uranium 238	1.80E+00	3.43E-01	4.61E-02	1.00	100.68
Rm 125 NW	015.044	9802321-07	Plutonium-239/240				0.30	
			Uranium 233/234	1.48E+00	3.12E-01	1.02E-01	1.00	98.2
			Uranium 235	5.93E-02	6.85E-02	1.02E-01	1.00	98.2
			Uranium 238	1.46E+00	3.08E-01	4.59E-02	1.00	98.2
Rm 125 East Center	016.047	9802321-08	Plutonium-239/240				0.30	
			Uranium 233/234	1.27E+00	2.72E-01	1.47E-01	1.00	105.19
			Uranium 235	1.31E-01	9.87E-02	1.36E-01	1.00	105.19
			Uranium 238	1.57E+00	3.00E-01	1.36E-01	1.00	105.19
Rm 125 SE	017.050	9802321-09	Plutonium-239/240				0.30	
			Uranium 233/234	1.46E+00	3.00E-01	1.16E-01	1.00	106
			Uranium 235	8.66E-02	7.71E-02	9.45E-02	1.00	106
			Uranium 238	1.42E+00	2.97E-01	1.33E-01	1.00	106
Rm 109A South	020.059	9802321-10	Plutonium-239/240				0.30	

Sample QC Results Summary
3/16/98

			Uranium 233/234	1.13E+00	3.11E-01	3.42E-01	1.00	80.86
			Uranium 235	1.43E-01	1.48E-01	2.63E-01	1.00	80.86
			Uranium 238	1.32E+00	3.04E-01	2.04E-01	1.00	80.86
Rm 109B North	021.062	9802321-11	Plutonium-239/240				0.30	
			Uranium 233/234	1.07E+00	2.49E-01	1.09E-01	1.00	94.15
			Uranium 235	1.03E-01	7.63E-02	3.99E-02	1.00	94.15
			Uranium 238	1.37E+00	2.80E-01	1.09E-01	1.00	94.15
Rm 109B South	022.065	9802321-12	Plutonium-239/240				0.30	
			Uranium 233/234	1.27E+00	2.80E-01	1.56E-01	1.00	95.4
			Uranium 235	5.37E-02	7.24E-02	1.30E-01	1.00	95.4
			Uranium 238	1.32E+00	2.80E-01	9.24E-02	1.00	95.4
Rm 111 west central	030.089	9802321-13	Plutonium-239/240				0.30	
			Uranium 233/234	1.38E+00	3.01E-01	1.55E-01	1.00	88.53
			Uranium 235	1.16E-01	9.48E-02	1.23E-01	1.00	88.53
			Uranium 238	1.42E+00	3.02E-01	9.95E-02	1.00	88.53
Rm 124 West	031.092	9802321-14	Plutonium-239/240				0.30	
			Uranium 233/234	1.12E+01	7.96E-01	1.09E-01	1.00	96.93
			Uranium 235	5.98E-01	1.85E-01	8.85E-02	1.00	96.93
			Uranium 238	1.20E+01	8.25E-01	3.99E-02	1.00	96.93
Rm 101A	034.101	9802321-15	Plutonium-239/240				0.30	
			Uranium 233/234	1.62E+00	3.10E-01	4.18E-02	1.00	92.03
			Uranium 235	7.71E-02	7.71E-02	1.14E-01	1.00	92.03
			Uranium 238	1.74E+00	3.21E-01	4.18E-02	1.00	92.03
R111 NW Corner	037.110	9802321-16	Plutonium-239/240				0.30	
			Uranium 233/234	1.44E+00	2.94E-01	9.33E-02	1.00	95.51
			Uranium 235	3.88E-02	5.49E-02	9.33E-02	1.00	95.51
			Uranium 238	1.42E+00	2.92E-01	9.33E-02	1.00	95.51
	QC488764	BLANK	Plutonium-239/240	4.02E-02	3.22E-02	1.82E-02	0.30	22.02
	QC488765	DUP	Plutonium-239/240	-1.17E-02	5.15E-02	1.27E-01	0.30	64.46
	QC488766	LCS	Plutonium-239/240	1.74E+00	2.16E-01	9.39E-02	0.30	22.29
	QC488773	BLANK	Uranium 233/234	1.68E-01	1.06E-01	1.13E-01	1.00	101.14
			Uranium 235	3.05E-02	5.60E-02	1.13E-01	1.00	101.14

Sample QC Results Summary
3/16/98

		Uranium 238	-7.63E-03	1.50E-02	9.16E-02	1.00	101.14
QC488774	DUP	Uranium 233/234	1.04E+00	2.47E-01	1.25E-01	1.00	98.11
		Uranium 235	4.45E-02	5.02E-02	4.01E-02	1.00	98.11
		Uranium 238	1.30E+00	2.74E-01	1.09E-01	1.00	98.11
QC488775	LCS	Uranium 233/234	1.76E+01	9.81E-01	1.05E-01	1.00	107.56
		Uranium 235	1.02E+00	2.38E-01	1.05E-01	1.00	107.56
		Uranium 238	1.79E+01	9.87E-01	3.84E-02	1.00	107.56

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: March 23, 1998

Sample ID	: 98A1226 001.002
Lab ID	: 9803321-01 ROOM 105
Matrix	: Misc.
Date Collected	: 03/03/98 WEST SIDE
Date Received	: 03/13/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		2.52	+/- 0.427	0.144	1.00	pCi/g	1.0	EJB	03/22/98	1753	118681	1
Americium-241	U	0.0101	+/- 0.143	0.225	0.400	pCi/g	1.0					
Antimony-124	U	-0.0205	+/- 0.0257	0.0440	1.00	pCi/g	1.0					
Antimony-125	U	0.0476	+/- 0.0641	0.113	0.200	pCi/g	1.0					
Barium-133	U	0.0160	+/- 0.0295	0.0518	1.00	pCi/g	1.0					
Barium-140	U	0.103	+/- 0.214	0.391	1.00	pCi/g	1.0					
Beryllium-7	U	-0.184	+/- 0.221	0.384	1.00	pCi/g	1.0					
Bismuth-212		1.74	+/- 0.428	0.316	1.00	pCi/g	1.0					
Bismuth-214	J	0.725	+/- 0.139	0.0752	1.00	pCi/g	1.0					
Cerium-139	U	-0.00545	+/- 0.0239	0.0425	1.00	pCi/g	1.0					
Cerium-141	U	-0.0213	+/- 0.0546	0.0974	1.00	pCi/g	1.0					
Cerium-144	U	0.0394	+/- 0.169	0.306	0.500	pCi/g	1.0					
Cesium-134	U	0.0130	+/- 0.0221	0.0365	0.100	pCi/g	1.0					
Cesium-136	U	-0.0594	+/- 0.104	0.146	1.00	pCi/g	1.0					
Cesium-137	U	-0.0162	+/- 0.0242	0.0414	5.00	pCi/g	1.0					
Chromium-51	U	-0.00458	+/- 0.297	0.513	1.00	pCi/g	1.0					
Cobalt-56	U	0.0238	+/- 0.0246	0.0461	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00589	+/- 0.0210	0.0380	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00741	+/- 0.0245	0.0424	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00604	+/- 0.0232	0.0413	0.100	pCi/g	1.0					
Europium-152	U	-0.0658	+/- 0.0652	0.107	0.500	pCi/g	1.0					
Europium-154	U	-0.0549	+/- 0.0718	0.122	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.171	0.163	0.200	pCi/g	1.0					
Iodine-131	U	0.0310	+/- 0.124	0.215	5.00	pCi/g	1.0					
Iridium-192	U	-0.00503	+/- 0.0259	0.0445	1.00	pCi/g	1.0					
Iron-59	U	0.0173	+/- 0.0590	0.105	1.00	pCi/g	1.0					
Lead-212		2.82	+/- 0.340	0.0703	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464 RM 105 WEST SIDE
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: March 23, 1998 Page 2 of 3

Sample ID : 98A1226 001.002

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.740	+/- 0.134	0.0854	1.00	pCi/g	1.0					
Manganese-54	U	0.0396	+/- 0.0395	0.0471	0.100	pCi/g	1.0	EJB	03/22/98	1753	118681	1
Mercury-203	U	0.00	+/- 0.0599	0.0501	1.00	pCi/g	1.0					
Neodymium-147	U	0.272	+/- 0.487	0.900	1.00	pCi/g	1.0					
Neptunium-239	U	-0.00914	+/- 0.158	0.287	1.00	pCi/g	1.0					
Niobium-94	U	0.0164	+/- 0.0220	0.0405	1.00	pCi/g	1.0					
Niobium-95	U	-0.0150	+/- 0.0410	0.0613	1.00	pCi/g	1.0					
Potassium-40		24.0	+/- 2.78	0.305	1.00	pCi/g	1.0					
Promethium-144	U	0.00740	+/- 0.0231	0.0416	0.100	pCi/g	1.0					
Promethium-146	U	0.0467	+/- 0.0290	0.0554	0.100	pCi/g	1.0					
Radium-226	J	0.725	+/- 0.139	0.0752	1.00	pCi/g	1.0					
Radium-228		2.52	+/- 0.427	0.144	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0876	+/- 0.284	0.391	0.800	pCi/g	1.0					
Silver-110M	U	0.00919	+/- 0.0225	0.0410	1.00	pCi/g	1.0					
Sodium-22	U	-0.0197	+/- 0.0257	0.0437	0.700	pCi/g	1.0					
Thallium-208	J	0.941	+/- 0.123	0.0401	1.00	pCi/g	1.0					
Thorium-234		2.24	+/- 1.90	1.86	1.00	pCi/g	1.0					
Tin-113	U	-0.0102	+/- 0.0310	0.0521	1.00	pCi/g	1.0					
Uranium-235	U	0.0190	+/- 0.165	0.298	0.500	pCi/g	1.0					
Yttrium-88	U	0.00748	+/- 0.0224	0.0430	0.100	pCi/g	1.0					
Zinc-65	U	-0.00901	+/- 0.0669	0.0988	0.200	pCi/g	1.0					
Zirconium-95	U	0.00	+/- 0.0666	0.0951	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464 RM 105 WEST SIDE
Contact: Ms. Virgene Idcker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: March 23, 1998 Page 3 of 3

Sample ID : 98A1226 001.002

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

Eu-155, Hg203 not quantified due to Interference.
Zr-95 not quantified due to low abundance.

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9803321-01

Rocky Flats

Sample QC Results Summary
4/8/98

Batch # : 118703
RIN 98A1266 105 Core
Line Item Code: RC01B023
Matrix: Soil

RM 105
WESTSIDE

KHCO ID #	EPI ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	Tracer Yield %
98A1266-001,003	9803321-02	Th-230	4.38E-01	1.01E-01	4.59E-02	64.65
		Th-232	7.72E-01	1.33E-01	4.05E-02	64.65
QC494968	Blank	Th-230	6.36E-02	8.51E-02	1.37E-01	16.91
		Th-232	3.91E-02	7.03E-02	1.37E-01	16.91
QC494969	Duplicate	Th-230	3.48E-01	8.36E-02	4.91E-02	79.89
		Th-232	7.66E-01	1.22E-01	4.26E-02	79.89
QC494970	LCS	Th-230	4.64E-01	9.37E-02	2.75E-02	84.76
		Th-232	3.58E+00	2.60E-01	4.18E-02	84.76

LCS Recovery:

Th	3.64	98%

Equivalency test:

Th-230	F/E = 0.69
Th-232	F/E = 0.03

Rocky Flats

Sample QC Results Summary
4/8/98

Batch # : 118535
RIN 98A1266
Line Item Code: RC05B002
Matrix: Soil

RM 105
WEST SIDE

KHCO ID #	EPI ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	Recovery %
98A1266-001.003	9803321-02	Sr-89/90	4.58E+01	6.04E-01	2.40E-01	57
QC494433	Blank	Sr-89/90	2.37E-01	1.45E-01	2.72E-01	83
QC494434	Duplicate	Sr-89/90	4.12E+01	4.43E-01	1.37E-01	96
QC494435	LCS	Sr-89/90	1.86E+01	4.06E-01	2.40E-01	96

LCS Recovery:
Sr-89/90 22.64 82%

Equivalency test:
Sr-89/90 F/E = 6.1678

Rocky Flats

Sample QC Results Summary
4/8/98

Batch # : 118539
RIN 98A1266
Line Item Code: RC04B003
Matrix: Soil

RM 105
WEST SIDE

KHCO ID #	EPI ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g
98A1266-001.003	9803321-02	Alpha	1.14E+01	4.65E+00	3.00E+00
		Beta	2.17E+02	1.02E+01	5.15E+00
QC494446	Blank	Alpha	3.52E-01	9.99E-01	2.27E+00
		Beta	3.26E+00	2.29E+00	4.59E+00
QC494447	Duplicate	Alpha	3.12E+01	6.26E+00	3.19E+00
		Beta	1.84E+02	9.33E+00	5.14E+00
QC494449	LCS	Alpha	7.78E+01	4.99E+00	1.11E+00
		Beta	8.03E+01	4.02E+00	2.23E+00

LCS Recovery:

Alpha	69.9	111%
Beta	73.86	109%

Equivalency test:

Alpha	F/E = 2.648
Beta	F/E = 2.402

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 002.006 Room 131 West
Lab ID	: 9802321-18
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.66	+/- 0.323	0.166	1.00	pCi/g	1.0	EJB	02/19/98	2014	116863	1
Americium-241	U	0.0117	+/- 0.0427	0.0732	0.400	pCi/g	1.0					
Antimony-124	U	0.00452	+/- 0.0278	0.0514	1.00	pCi/g	1.0					
Antimony-125	U	0.0440	+/- 0.0677	0.124	0.200	pCi/g	1.0					
Barium-133	U	-0.0262	+/- 0.0373	0.0530	1.00	pCi/g	1.0					
Barium-140	U	-0.0513	+/- 0.149	0.263	1.00	pCi/g	1.0					
Beryllium-7	U	0.122	+/- 0.314	0.413	1.00	pCi/g	1.0					
Bismuth-212		1.09	+/- 0.447	0.398	1.00	pCi/g	1.0					
Bismuth-214	J	0.784	+/- 0.167	0.0907	1.00	pCi/g	1.0					
Cerium-139	U	0.000911	+/- 0.0204	0.0367	1.00	pCi/g	1.0					
Cerium-141	U	0.0169	+/- 0.0396	0.0728	1.00	pCi/g	1.0					
Cerium-144	U	-0.115	+/- 0.139	0.240	0.500	pCi/g	1.0					
Cesium-134	U	0.0112	+/- 0.0255	0.0480	0.100	pCi/g	1.0					
Cesium-136	U	0.0104	+/- 0.0662	0.120	1.00	pCi/g	1.0					
Cesium-137	U	0.0204	+/- 0.0568	0.0578	5.00	pCi/g	1.0					
Chromium-51	U	0.00633	+/- 0.236	0.413	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0231	+/- 0.0332	0.0549	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00159	+/- 0.0161	0.0293	0.100	pCi/g	1.0					
Cobalt-58	U	0.0112	+/- 0.0295	0.0554	1.00	pCi/g	1.0					
Cobalt-60	U	0.0138	+/- 0.0334	0.0654	0.100	pCi/g	1.0					
Europium-152	U	-0.0170	+/- 0.0684	0.117	0.500	pCi/g	1.0					
Europium-154	U	-0.00896	+/- 0.0979	0.180	0.200	pCi/g	1.0					
Europium-155	U	0.0394	+/- 0.0645	0.121	0.200	pCi/g	1.0					
Iodine-131	U	-0.0365	+/- 0.0595	0.0980	5.00	pCi/g	1.0					
Iridium-192	U	-0.00668	+/- 0.0249	0.0426	1.00	pCi/g	1.0					
Iron-59	U	-0.0131	+/- 0.0746	0.129	1.00	pCi/g	1.0					
Lead-212		1.28	+/- 0.187	0.0714	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 002.006

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.854	+/- 0.166	0.0878	1.00	pCi/g	1.0					
Manganese-54	U	-0.0306	+/- 0.0346	0.0559	0.100	pCi/g	1.0	EJB	02/19/98	2014	116863	1
Mercury-203	U	-0.00227	+/- 0.0280	0.0488	1.00	pCi/g	1.0					
Neodymium-147	U	-0.00347	+/- 0.306	0.562	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0627	+/- 0.124	0.222	1.00	pCi/g	1.0					
Niobium-94	U	-0.0147	+/- 0.0257	0.0439	1.00	pCi/g	1.0					
Niobium-95	U	-0.0256	+/- 0.0436	0.0629	1.00	pCi/g	1.0					
Potassium-40		24.2	+/- 2.87	0.437	1.00	pCi/g	1.0					
Promethium-144	U	0.0210	+/- 0.0281	0.0538	0.100	pCi/g	1.0					
Promethium-146	U	-0.0134	+/- 0.0319	0.0571	0.100	pCi/g	1.0					
Radium-226	J	0.784	+/- 0.167	0.0907	1.00	pCi/g	1.0					
Radium-228		1.66	+/- 0.323	0.166	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0358	+/- 0.252	0.465	0.800	pCi/g	1.0					
Silver-110M	U	-0.0100	+/- 0.0315	0.0482	1.00	pCi/g	1.0					
Sodium-22	U	-0.00311	+/- 0.0350	0.0644	0.700	pCi/g	1.0					
Thallium-208	J	0.434	+/- 0.0998	0.0538	1.00	pCi/g	1.0					
Thorium-234		1.34	+/- 0.873	0.709	1.00	pCi/g	1.0					
Tin-113	U	0.00234	+/- 0.0317	0.0554	1.00	pCi/g	1.0					
Uranium-235	U	-0.0125	+/- 0.152	0.273	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00102	+/- 0.0238	0.0472	0.100	pCi/g	1.0					
Zinc-65	U	0.0141	+/- 0.0827	0.154	0.200	pCi/g	1.0					
Zirconium-95	U	0.0333	+/- 0.0599	0.112	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 002.006

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 008.024 Room 103 North
Lab ID	: 9802321-19
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.50	+/- 0.288	0.170	1.00	pCi/g	1.0	EJB	02/20/98	0128	116863	1
Americium-241	U	-0.0118	+/- 0.0661	0.122	0.400	pCi/g	1.0					
Antimony-124	U	-0.00318	+/- 0.0242	0.0425	1.00	pCi/g	1.0					
Antimony-125	U	0.0451	+/- 0.0557	0.101	0.200	pCi/g	1.0					
Barium-133	U	0.00137	+/- 0.0288	0.0446	1.00	pCi/g	1.0					
Barium-140	U	0.0444	+/- 0.125	0.229	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0511	+/- 0.191	0.323	1.00	pCi/g	1.0					
Bismuth-212		1.24	+/- 0.347	0.315	1.00	pCi/g	1.0					
Bismuth-214	J	0.605	+/- 0.128	0.0745	1.00	pCi/g	1.0					
Cerium-139	U	-0.0210	+/- 0.0201	0.0329	1.00	pCi/g	1.0					
Cerium-141	U	0.0237	+/- 0.0385	0.0687	1.00	pCi/g	1.0					
Cerium-144	U	0.125	+/- 0.247	0.240	0.500	pCi/g	1.0					
Cesium-134	U	-0.0191	+/- 0.0260	0.0373	0.100	pCi/g	1.0					
Cesium-136	U	-0.0200	+/- 0.0560	0.0967	1.00	pCi/g	1.0					
Cesium-137	U	-0.00712	+/- 0.0245	0.0424	5.00	pCi/g	1.0					
Chromium-51	U	-0.0546	+/- 0.204	0.356	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0105	+/- 0.0251	0.0420	1.00	pCi/g	1.0					
Cobalt-57	U	0.0123	+/- 0.0162	0.0294	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00675	+/- 0.0246	0.0419	1.00	pCi/g	1.0					
Cobalt-60	U	0.0171	+/- 0.0251	0.0471	0.100	pCi/g	1.0					
Europium-152	U	-0.0177	+/- 0.0594	0.103	0.500	pCi/g	1.0					
Europium-154	U	-0.0108	+/- 0.0794	0.137	0.200	pCi/g	1.0					
Europium-155	U	0.0459	+/- 0.0953	0.127	0.200	pCi/g	1.0					
Iodine-131	U	-0.0355	+/- 0.0451	0.0753	5.00	pCi/g	1.0					
Iridium-192	U	0.00843	+/- 0.0197	0.0358	1.00	pCi/g	1.0					
Iron-59	U	-0.0281	+/- 0.0567	0.0964	1.00	pCi/g	1.0					
Lead-212		1.58	+/- 0.197	0.0647	1.00	pCi/g	1.0					

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9802321-19

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 008.024

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.699	+/- 0.132	0.0723	1.00	pCi/g	1.0					
Manganese-54	U	0.00181	+/- 0.0238	0.0415	0.100	pCi/g	1.0	EJB	02/20/98	0128	116863	1
Mercury-203	U	0.00	+/- 0.0315	0.0417	1.00	pCi/g	1.0					
Neodymium-147	U	0.0553	+/- 0.248	0.453	1.00	pCi/g	1.0					
Neptunium-239	U	0.183	+/- 0.189	0.222	1.00	pCi/g	1.0					
Niobium-94	U	0.00165	+/- 0.0228	0.0401	1.00	pCi/g	1.0					
Niobium-95	U	0.00	+/- 0.0308	0.0534	1.00	pCi/g	1.0					
Potassium-40		27.2	+/- 3.18	0.400	1.00	pCi/g	1.0					
Promethium-144	U	0.00830	+/- 0.0227	0.0407	0.100	pCi/g	1.0					
Promethium-146	U	0.0163	+/- 0.0278	0.0496	0.100	pCi/g	1.0					
Radium-226	J	0.605	+/- 0.128	0.0745	1.00	pCi/g	1.0					
Radium-228		1.50	+/- 0.288	0.170	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0894	+/- 0.201	0.347	0.800	pCi/g	1.0					
Silver-110M	U	-0.00276	+/- 0.0215	0.0377	1.00	pCi/g	1.0					
Sodium-22	U	-0.00391	+/- 0.0283	0.0491	0.700	pCi/g	1.0					
Thallium-208	J	0.433	+/- 0.0853	0.0387	1.00	pCi/g	1.0					
Thorium-234		1.68	+/- 1.15	1.09	1.00	pCi/g	1.0					
Tin-113	U	0.00198	+/- 0.0257	0.0451	1.00	pCi/g	1.0					
Uranium-235	U	0.0262	+/- 0.145	0.255	0.500	pCi/g	1.0					
Yttrium-88	U	0.00651	+/- 0.0195	0.0381	0.100	pCi/g	1.0					
Zinc-65	U	0.00107	+/- 0.0732	0.110	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0177	+/- 0.0427	0.0724	1.00	pCi/g	1.0					

Comments:

Hg-203 not quantified due to interference.

Nb-95 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 008.024

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
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Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 009.027 Room 106 South
Lab ID : 9802321-20
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.51	+/- 0.350	0.225	1.00	pCi/g	1.0	EJB	02/20/98	0756	116863	1
Americium-241	U	0.00185	+/- 0.126	0.198	0.400	pCi/g	1.0					
Antimony-124	U	-0.000123	+/- 0.0304	0.0544	1.00	pCi/g	1.0					
Antimony-125	U	0.0775	+/- 0.0757	0.132	0.200	pCi/g	1.0					
Barium-133	U	-0.000277	+/- 0.0380	0.0621	1.00	pCi/g	1.0					
Barium-140	U	0.0426	+/- 0.179	0.328	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0559	+/- 0.255	0.455	1.00	pCi/g	1.0					
Bismuth-212		1.12	+/- 0.457	0.389	1.00	pCi/g	1.0					
Bismuth-214	I	0.695	+/- 0.149	0.0953	1.00	pCi/g	1.0					
Cerium-139	U	-0.0153	+/- 0.0232	0.0401	1.00	pCi/g	1.0					
Cerium-141	U	-0.00869	+/- 0.0448	0.0800	1.00	pCi/g	1.0					
Cerium-144	U	0.0543	+/- 0.156	0.288	0.500	pCi/g	1.0					
Cesium-134	U	0.0154	+/- 0.0295	0.0494	0.100	pCi/g	1.0					
Cesium-136	U	-0.0689	+/- 0.0713	0.116	1.00	pCi/g	1.0					
Cesium-137	U	0.00724	+/- 0.0337	0.0609	5.00	pCi/g	1.0					
Chromium-51	U	-0.194	+/- 0.297	0.488	1.00	pCi/g	1.0					
Cobalt-56	U	0.00423	+/- 0.0416	0.0642	1.00	pCi/g	1.0					
Cobalt-57	U	0.0195	+/- 0.0191	0.0361	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0157	+/- 0.0298	0.0496	1.00	pCi/g	1.0					
Cobalt-60	U	0.0158	+/- 0.0344	0.0665	0.100	pCi/g	1.0					
Europium-152	U	-0.0569	+/- 0.0890	0.145	0.500	pCi/g	1.0					
Europium-154	U	-0.0221	+/- 0.112	0.198	0.200	pCi/g	1.0					
Europium-155	U	0.0131	+/- 0.0849	0.157	0.200	pCi/g	1.0					
Iodine-131	U	-0.0401	+/- 0.0618	0.109	5.00	pCi/g	1.0					
Iridium-192	U	-0.00880	+/- 0.0294	0.0497	1.00	pCi/g	1.0					
Iron-59	U	0.0799	+/- 0.0738	0.148	1.00	pCi/g	1.0					
Lead-212		1.50	+/- 0.230	0.0841	1.00	pCi/g	1.0					

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Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 009.027

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.854	+/- 0.175	0.106	1.00	pCi/g	1.0					
Manganese-54	U	0.0271	+/- 0.0351	0.0653	0.100	pCi/g	1.0	EJB	02/20/98	0756	116863	1
Mercury-203	U	0.0481	+/- 0.0533	0.0498	1.00	pCi/g	1.0					
Neodymium-147	U	-0.0608	+/- 0.355	0.632	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0682	+/- 0.145	0.260	1.00	pCi/g	1.0					
Niobium-94	U	-0.00145	+/- 0.0314	0.0552	1.00	pCi/g	1.0					
Niobium-95	U	-0.0156	+/- 0.0432	0.0731	1.00	pCi/g	1.0					
Potassium-40		24.3	+/- 2.91	0.591	1.00	pCi/g	1.0					
Promethium-144	U	-0.0149	+/- 0.0303	0.0511	0.100	pCi/g	1.0					
Promethium-146	U	0.00595	+/- 0.0366	0.0674	0.100	pCi/g	1.0					
Radium-226	J	0.695	+/- 0.149	0.0953	1.00	pCi/g	1.0					
Radium-228		1.51	+/- 0.350	0.225	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0230	+/- 0.287	0.509	0.800	pCi/g	1.0					
Silver-110M	U	0.00927	+/- 0.0305	0.0556	1.00	pCi/g	1.0					
Sodium-22	U	-0.00759	+/- 0.0400	0.0707	0.700	pCi/g	1.0					
Thallium-208	J	0.477	+/- 0.0903	0.0516	1.00	pCi/g	1.0					
Thorium-234		2.95	+/- 1.94	1.65	1.00	pCi/g	1.0					
Tin-113	U	-0.00720	+/- 0.0330	0.0600	1.00	pCi/g	1.0					
Uranium-235	U	-0.0424	+/- 0.170	0.302	0.500	pCi/g	1.0					
Yttrium-88	U	0.0107	+/- 0.0257	0.0559	0.100	pCi/g	1.0					
Zinc-65	U	-0.0802	+/- 0.0926	0.153	0.200	pCi/g	1.0					
Zirconium-95	U	0.0171	+/- 0.0581	0.106	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 009.027

M = Method Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 010.030 Room 106 north
Lab ID	: 9802321-21
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.36	+/- 0.329	0.212	1.00	pCi/g	1.0	EJB	02/20/98	0757	116863	1
Americium-241	U	-0.0427	+/- 0.134	0.237	0.400	pCi/g	1.0					
Antimony-124	U	0.0149	+/- 0.0323	0.0585	1.00	pCi/g	1.0					
Antimony-125	U	0.0803	+/- 0.0795	0.151	0.200	pCi/g	1.0					
Barium-133	U	0.0189	+/- 0.0395	0.0651	1.00	pCi/g	1.0					
Barium-140	U	0.109	+/- 0.171	0.312	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0236	+/- 0.240	0.424	1.00	pCi/g	1.0					
Bismuth-212	J	0.599	+/- 0.437	0.524	1.00	pCi/g	1.0					
Bismuth-214	J	0.785	+/- 0.169	0.106	1.00	pCi/g	1.0					
Cerium-139	U	-0.0278	+/- 0.0265	0.0428	1.00	pCi/g	1.0					
Cerium-141	U	-0.00395	+/- 0.0539	0.0926	1.00	pCi/g	1.0					
Cerium-144	U	-0.00170	+/- 0.187	0.323	0.500	pCi/g	1.0					
Cesium-134	U	-0.00907	+/- 0.0344	0.0507	0.100	pCi/g	1.0					
Cesium-136	U	-0.0160	+/- 0.0743	0.131	1.00	pCi/g	1.0					
Cesium-137	U	-0.00199	+/- 0.0350	0.0605	5.00	pCi/g	1.0					
Chromium-51	U	0.0927	+/- 0.309	0.563	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0262	+/- 0.0341	0.0575	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0154	+/- 0.0227	0.0382	0.100	pCi/g	1.0					
Cobalt-58	U	-0.000733	+/- 0.0311	0.0570	1.00	pCi/g	1.0					
Cobalt-60	U	0.0167	+/- 0.0335	0.0645	0.100	pCi/g	1.0					
Europium-152	U	0.0359	+/- 0.0938	0.153	0.500	pCi/g	1.0					
Europium-154	U	0.0660	+/- 0.110	0.209	0.200	pCi/g	1.0					
Europium-155	U	0.0567	+/- 0.0969	0.174	0.200	pCi/g	1.0					
Iodine-131	U	0.0263	+/- 0.0670	0.123	5.00	pCi/g	1.0					
Iridium-192	U	0.00785	+/- 0.0303	0.0552	1.00	pCi/g	1.0					
Iron-59	U	0.0446	+/- 0.0783	0.148	1.00	pCi/g	1.0					
Lead-212		1.63	+/- 0.220	0.0873	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 010.030

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.778	+/- 0.178	0.108	1.00	pCi/g	1.0					
Manganese-54	U	0.0311	+/- 0.0313	0.0614	0.100	pCi/g	1.0	EJB	02/20/98	0757	116863	1
Mercury-203	U	0.0158	+/- 0.0324	0.0599	1.00	pCi/g	1.0					
Neodymium-147	U	-0.462	+/- 0.384	0.596	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0584	+/- 0.173	0.296	1.00	pCi/g	1.0					
Niobium-94	U	0.0144	+/- 0.0293	0.0556	1.00	pCi/g	1.0					
Niobium-95	U	0.0611	+/- 0.0689	0.0790	1.00	pCi/g	1.0					
Potassium-40		27.0	+/- 3.23	0.555	1.00	pCi/g	1.0					
Promethium-144	U	-0.00931	+/- 0.0299	0.0534	0.100	pCi/g	1.0					
Promethium-146	U	-0.0468	+/- 0.0476	0.0658	0.100	pCi/g	1.0					
Radium-226	J	0.785	+/- 0.169	0.106	1.00	pCi/g	1.0					
Radium-228		1.36	+/- 0.329	0.212	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0762	+/- 0.269	0.460	0.800	pCi/g	1.0					
Silver-110M	U	-0.000181	+/- 0.0319	0.0555	1.00	pCi/g	1.0					
Sodium-22	U	0.0237	+/- 0.0393	0.0745	0.700	pCi/g	1.0					
Thallium-208	J	0.436	+/- 0.0878	0.0627	1.00	pCi/g	1.0					
Thorium-234		2.24	+/- 1.79	1.95	1.00	pCi/g	1.0					
Tin-113	U	-0.0374	+/- 0.0367	0.0606	1.00	pCi/g	1.0					
Uranium-235	U	0.217	+/- 0.197	0.350	0.500	pCi/g	1.0					
Yttrium-88	U	0.0158	+/- 0.0297	0.0625	0.100	pCi/g	1.0					
Zinc-65	U	0.0402	+/- 0.0929	0.152	0.200	pCi/g	1.0					
Zirconium-95	U	0.00	+/- 0.0822	0.116	1.00	pCi/g	1.0					

Comments:
Zr-95 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 010.030

M = Method	Method-Description

Notes:
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Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797

Report Date: February 24, 1998

Sample ID : 98A0621 015.045 Room 125 NW
Lab ID : 9802321-22
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		2.57	+/- 0.504	0.201	1.00	pCi/g	1.0	EJB	02/20/98	0759	116863	1
Americium-241	U	0.0504	+/- 0.149	0.255	0.400	pCi/g	1.0					
Antimony-124	U	-0.0174	+/- 0.0355	0.0614	1.00	pCi/g	1.0					
Antimony-125	U	0.00279	+/- 0.0831	0.153	0.200	pCi/g	1.0					
Barium-133	U	-0.179	+/- 0.0603	0.0739	1.00	pCi/g	1.0					
Barium-140	U	-0.177	+/- 0.199	0.320	1.00	pCi/g	1.0					
Beryllium-7	U	0.0463	+/- 0.272	0.502	1.00	pCi/g	1.0					
Bismuth-212		1.59	+/- 0.560	0.451	1.00	pCi/g	1.0					
Bismuth-214		1.16	+/- 0.214	0.124	1.00	pCi/g	1.0					
Cerium-139	U	-0.00992	+/- 0.0274	0.0480	1.00	pCi/g	1.0					
Cerium-141	U	0.0398	+/- 0.0503	0.0901	1.00	pCi/g	1.0					
Cerium-144	U	0.0901	+/- 0.189	0.345	0.500	pCi/g	1.0					
Cesium-134	U	-0.0835	+/- 0.0380	0.0555	0.100	pCi/g	1.0					
Cesium-136	U	-0.0371	+/- 0.0694	0.122	1.00	pCi/g	1.0					
Cesium-137	U	0.00876	+/- 0.0356	0.0650	5.00	pCi/g	1.0					
Chromium-51	U	-0.0433	+/- 0.321	0.551	1.00	pCi/g	1.0					
Cobalt-56	U	-0.00576	+/- 0.0349	0.0611	1.00	pCi/g	1.0					
Cobalt-57	U	-0.000468	+/- 0.0235	0.0426	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0111	+/- 0.0324	0.0559	1.00	pCi/g	1.0					
Cobalt-60	U	0.0133	+/- 0.0383	0.0734	0.100	pCi/g	1.0					
Europium-152	U	0.00268	+/- 0.0994	0.171	0.500	pCi/g	1.0					
Europium-154	U	-0.0207	+/- 0.114	0.204	0.200	pCi/g	1.0					
Europium-155	U	0.126	+/- 0.104	0.196	0.200	pCi/g	1.0					
Iodine-131	U	-0.00778	+/- 0.0732	0.125	5.00	pCi/g	1.0					
Iridium-192	U	0.0197	+/- 0.0307	0.0553	1.00	pCi/g	1.0					
Iron-59	U	0.0567	+/- 0.0642	0.145	1.00	pCi/g	1.0					
Lead-212		2.41	+/- 0.320	0.0935	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 015.045

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.37	+/- 0.224	0.120	1.00	pCi/g	1.0					
Manganese-54	U	0.0607	+/- 0.0420	0.0760	0.100	pCi/g	1.0	EJB	02/20/98	0759	116863	1
Mercury-203	U	0.00	+/- 0.0706	0.0584	1.00	pCi/g	1.0					
Neodymium-147	U	-0.184	+/- 0.387	0.676	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0475	+/- 0.182	0.326	1.00	pCi/g	1.0					
Niobium-94	U	-0.0128	+/- 0.0346	0.0596	1.00	pCi/g	1.0					
Niobium-95	U	0.0113	+/- 0.0480	0.0765	1.00	pCi/g	1.0					
Potassium-40		22.8	+/- 2.81	0.615	1.00	pCi/g	1.0					
Promethium-144	U	-0.0259	+/- 0.0358	0.0598	0.100	pCi/g	1.0					
Promethium-146	U	0.0223	+/- 0.0415	0.0781	0.100	pCi/g	1.0					
Radium-226		1.16	+/- 0.214	0.124	1.00	pCi/g	1.0					
Radium-228		2.57	+/- 0.504	0.201	1.00	pCi/g	1.0					
Ruthenium-106	U	0.100	+/- 0.280	0.520	0.800	pCi/g	1.0					
Silver-110M	U	-0.0358	+/- 0.0314	0.0503	1.00	pCi/g	1.0					
Sodium-22	U	-0.00748	+/- 0.0405	0.0728	0.700	pCi/g	1.0					
Thallium-208	J	0.784	+/- 0.131	0.0588	1.00	pCi/g	1.0					
Thorium-234		2.33	+/- 2.33	2.16	1.00	pCi/g	1.0					
Tin-113	U	-0.0246	+/- 0.0420	0.0743	1.00	pCi/g	1.0					
Uranium-235	U	0.196	+/- 0.237	0.352	0.500	pCi/g	1.0					
Yttrium-88	U	0.00171	+/- 0.0338	0.0641	0.100	pCi/g	1.0					
Zinc-65	U	-0.0586	+/- 0.0922	0.134	0.200	pCi/g	1.0					
Zirconium-95	U	0.0813	+/- 0.0891	0.124	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 015.045

M = Method	Method-Description

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 016.048 Room 125 East center
Lab ID : 9802321-23
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.42	+/- 0.360	0.186	1.00	pCi/g	1.0	EJB	02/20/98	0801	116863	1
Americium-241	U	0.0512	+/- 0.233	0.405	0.400	pCi/g	1.0					
Antimony-124	U	0.0240	+/- 0.0315	0.0598	1.00	pCi/g	1.0					
Antimony-125	U	-0.00314	+/- 0.0791	0.146	0.200	pCi/g	1.0					
Barium-133	U	0.0300	+/- 0.0414	0.0678	1.00	pCi/g	1.0					
Barium-140	U	-0.0685	+/- 0.162	0.284	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0137	+/- 0.252	0.461	1.00	pCi/g	1.0					
Bismuth-212		1.24	+/- 0.509	0.494	1.00	pCi/g	1.0					
Bismuth-214	J	0.985	+/- 0.197	0.0988	1.00	pCi/g	1.0					
Cerium-139	U	0.00673	+/- 0.0234	0.0428	1.00	pCi/g	1.0					
Cerium-141	U	0.0322	+/- 0.0471	0.0876	1.00	pCi/g	1.0					
Cerium-144	U	0.0450	+/- 0.161	0.298	0.500	pCi/g	1.0					
Cesium-134	U	-0.000898	+/- 0.0323	0.0511	0.100	pCi/g	1.0					
Cesium-136	U	-0.0398	+/- 0.0862	0.130	1.00	pCi/g	1.0					
Cesium-137	U	0.0166	+/- 0.0308	0.0581	5.00	pCi/g	1.0					
Chromium-51	U	-0.120	+/- 0.301	0.510	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0104	+/- 0.0310	0.0534	1.00	pCi/g	1.0					
Cobalt-57	U	0.00451	+/- 0.0208	0.0385	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0105	+/- 0.0376	0.0563	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00211	+/- 0.0307	0.0500	0.100	pCi/g	1.0					
Europium-152	U	-0.00796	+/- 0.0877	0.151	0.500	pCi/g	1.0					
Europium-154	U	-0.0441	+/- 0.105	0.184	0.200	pCi/g	1.0					
Europium-155	U	0.128	+/- 0.149	0.168	0.200	pCi/g	1.0					
Iodine-131	U	0.0370	+/- 0.0663	0.119	5.00	pCi/g	1.0					
Iridium-192	U	0.00299	+/- 0.0288	0.0507	1.00	pCi/g	1.0					
Iron-59	U	-0.0688	+/- 0.0896	0.128	1.00	pCi/g	1.0					
Lead-212		1.49	+/- 0.201	0.0775	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 016.048

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.981	+/- 0.184	0.109	1.00	pCi/g	1.0					
Manganese-54	U	-0.0199	+/- 0.0319	0.0532	0.100	pCi/g	1.0	EJB	02/20/98	0801	116863	1
Mercury-203	U	0.00	+/- 0.0676	0.0563	1.00	pCi/g	1.0					
Neodymium-147	U	-0.213	+/- 0.337	0.583	1.00	pCi/g	1.0					
Neptunium-239	U	0.0181	+/- 0.162	0.300	1.00	pCi/g	1.0					
Niobium-94	U	0.0178	+/- 0.0292	0.0547	1.00	pCi/g	1.0					
Niobium-95	U	0.0432	+/- 0.0294	0.0693	1.00	pCi/g	1.0					
Potassium-40		26.8	+/- 3.30	0.567	1.00	pCi/g	1.0					
Promethium-144	U	-0.00484	+/- 0.0289	0.0512	0.100	pCi/g	1.0					
Promethium-146	U	0.0319	+/- 0.0353	0.0687	0.100	pCi/g	1.0					
Radium-226	J	0.985	+/- 0.197	0.0988	1.00	pCi/g	1.0					
Radium-228		1.42	+/- 0.360	0.186	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0525	+/- 0.258	0.477	0.800	pCi/g	1.0					
Silver-110M	U	-0.00321	+/- 0.0271	0.0487	1.00	pCi/g	1.0					
Sodium-22	U	-0.0155	+/- 0.0374	0.0657	0.700	pCi/g	1.0					
Thallium-208	J	0.496	+/- 0.0880	0.0586	1.00	pCi/g	1.0					
Thorium-234	U	1.59	+/- 1.71	3.02	1.00	pCi/g	1.0					
Tin-113	U	-0.0148	+/- 0.0360	0.0649	1.00	pCi/g	1.0					
Uranium-235	U	0.0534	+/- 0.175	0.321	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00391	+/- 0.0334	0.0611	0.100	pCi/g	1.0					
Zinc-65	U	-0.0624	+/- 0.0895	0.129	0.200	pCi/g	1.0					
Zirconium-95	U	0.0703	+/- 0.0884	0.112	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Idcker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 016.048

M = Method **Method-Description**

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-012.036 Room 103A NW Corner
Lab ID	: 9802251-16
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.66	+/- 0.293	0.129	1.00	pCi/g	1.0	EJB	02/17/98	1027	116681	1
Americium-241	U	0.0368	+/- 0.0826	0.155	0.400	pCi/g	1.0					
Antimony-124	U	0.00686	+/- 0.0258	0.0407	1.00	pCi/g	1.0					
Antimony-125	U	-0.0434	+/- 0.0515	0.0881	0.200	pCi/g	1.0					
Barium-133	U	-0.0000468	+/- 0.0260	0.0417	1.00	pCi/g	1.0					
Barium-140	U	0.0908	+/- 0.144	0.259	1.00	pCi/g	1.0					
Beryllium-7	U	-0.00183	+/- 0.178	0.318	1.00	pCi/g	1.0					
Bismuth-212		1.26	+/- 0.424	0.264	1.00	pCi/g	1.0					
Bismuth-214	J	0.705	+/- 0.127	0.0689	1.00	pCi/g	1.0					
Cerium-139	U	0.0103	+/- 0.0173	0.0310	1.00	pCi/g	1.0					
Cerium-141	U	-0.00959	+/- 0.0341	0.0599	1.00	pCi/g	1.0					
Cerium-144	U	-0.00217	+/- 0.114	0.203	0.500	pCi/g	1.0					
Cesium-134	U	-0.00434	+/- 0.0232	0.0351	0.100	pCi/g	1.0					
Cesium-136	U	0.0191	+/- 0.0553	0.102	1.00	pCi/g	1.0					
Cesium-137	U	-0.00223	+/- 0.0269	0.0408	5.00	pCi/g	1.0					
Chromium-51	U	-0.00348	+/- 0.211	0.358	1.00	pCi/g	1.0					
Cobalt-56	U	0.0201	+/- 0.0268	0.0424	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00557	+/- 0.0141	0.0249	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00310	+/- 0.0236	0.0404	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00428	+/- 0.0211	0.0372	0.100	pCi/g	1.0					
Europium-152	U	-0.0641	+/- 0.0645	0.0890	0.500	pCi/g	1.0					
Europium-154	U	-0.0696	+/- 0.0855	0.117	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.106	0.105	0.200	pCi/g	1.0					
Iodine-131	U	-0.00478	+/- 0.0567	0.103	5.00	pCi/g	1.0					
Iridium-192	U	0.00677	+/- 0.0202	0.0350	1.00	pCi/g	1.0					
Iron-59	U	-0.000729	+/- 0.0536	0.0958	1.00	pCi/g	1.0					
Lead-212		1.78	+/- 0.217	0.0564	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Idecker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-012.036

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.723	+/- 0.130	0.0695	1.00	pCi/g	1.0					
Manganese-54	U	0.0352	+/- 0.0380	0.0354	0.100	pCi/g	1.0	EJB	02/17/98	1027	116681	1
Mercury-203	U	-0.00681	+/- 0.0266	0.0399	1.00	pCi/g	1.0					
Neodymium-147	U	-0.159	+/- 0.275	0.470	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0885	+/- 0.105	0.184	1.00	pCi/g	1.0					
Niobium-94	U	0.0103	+/- 0.0207	0.0371	1.00	pCi/g	1.0					
Niobium-95	U	0.00	+/- 0.0440	0.0465	1.00	pCi/g	1.0					
Potassium-40		20.9	+/- 2.37	0.333	1.00	pCi/g	1.0					
Promethium-144	U	-0.00566	+/- 0.0202	0.0345	0.100	pCi/g	1.0					
Promethium-146	U	0.00369	+/- 0.0243	0.0439	0.100	pCi/g	1.0					
Radium-226	J	0.705	+/- 0.127	0.0689	1.00	pCi/g	1.0					
Radium-228		1.66	+/- 0.293	0.129	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0842	+/- 0.197	0.336	0.800	pCi/g	1.0					
Silver-110M	U	0.0122	+/- 0.0365	0.0372	1.00	pCi/g	1.0					
Sodium-22	U	-0.0249	+/- 0.0305	0.0419	0.700	pCi/g	1.0					
Thallium-208	J	0.564	+/- 0.0822	0.0398	1.00	pCi/g	1.0					
Thorium-234		1.31	+/- 1.14	1.26	1.00	pCi/g	1.0					
Tin-113	U	0.00771	+/- 0.0259	0.0474	1.00	pCi/g	1.0					
Uranium-235	U	0.0500	+/- 0.118	0.212	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00278	+/- 0.0204	0.0378	0.100	pCi/g	1.0					
Zinc-65	U	-0.00774	+/- 0.0586	0.0896	0.200	pCi/g	1.0					
Zirconium-95	U	0.0144	+/- 0.0422	0.0749	1.00	pCi/g	1.0					

Comments:
Eu-155 not quantified due to interference.

Nb-95 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	*Environmental samples* Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-012.036
M = Method	**Method-Description**

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C.
	Rocky Flats Environmental Tech. Site
	Bldg. 881
	Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 001.003 Room 135
Lab ID	: 9802321-17
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.23	+/- 0.481	0.381	1.00	pCi/g	1.0	EJB	02/19/98	2012	116863	1
Americium-241	U	-0.0807	+/- 0.239	0.379	0.400	pCi/g	1.0					
Antimony-124	U	-0.0233	+/- 0.0668	0.0999	1.00	pCi/g	1.0					
Antimony-125	U	-0.0784	+/- 0.142	0.248	0.200	pCi/g	1.0					
Barium-133	U	-0.0277	+/- 0.0738	0.112	1.00	pCi/g	1.0					
Barium-140	U	0.000876	+/- 0.303	0.552	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0538	+/- 0.492	0.887	1.00	pCi/g	1.0					
Bismuth-212	J	0.918	+/- 0.922	0.876	1.00	pCi/g	1.0					
Bismuth-214		1.22	+/- 0.344	0.177	1.00	pCi/g	1.0					
Cerium-139	U	0.0371	+/- 0.0436	0.0799	1.00	pCi/g	1.0					
Cerium-141	U	0.0222	+/- 0.129	0.159	1.00	pCi/g	1.0					
Cerium-144	U	0.00	+/- 0.852	0.562	0.500	pCi/g	1.0					
Cesium-134	U	-0.0623	+/- 0.0617	0.0834	0.100	pCi/g	1.0					
Cesium-136	U	0.0409	+/- 0.116	0.226	1.00	pCi/g	1.0					
Cesium-137	U	0.0481	+/- 0.0452	0.119	5.00	pCi/g	1.0					
Chromium-51	U	0.110	+/- 0.521	0.917	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0411	+/- 0.0601	0.0994	1.00	pCi/g	1.0					
Cobalt-57	U	0.000981	+/- 0.0396	0.0709	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0315	+/- 0.0600	0.102	1.00	pCi/g	1.0					
Cobalt-60	U	0.0509	+/- 0.0643	0.130	0.100	pCi/g	1.0					
Europium-152	U	-0.0688	+/- 0.165	0.277	0.500	pCi/g	1.0					
Europium-154	U	-0.0858	+/- 0.180	0.314	0.200	pCi/g	1.0					
Europium-155	U	0.0488	+/- 0.164	0.299	0.200	pCi/g	1.0					
Iodine-131	U	0.0319	+/- 0.129	0.211	5.00	pCi/g	1.0					
Iridium-192	U	-0.00430	+/- 0.0521	0.0901	1.00	pCi/g	1.0					
Iron-59	U	-0.0534	+/- 0.157	0.237	1.00	pCi/g	1.0					
Lead-212		1.35	+/- 0.244	0.146	1.00	pCi/g	1.0					

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9802321-17

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 001.003

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.12	+/- 0.305	0.200	1.00	pCi/g	1.0					
Manganese-54	U	0.0108	+/- 0.0613	0.111	0.100	pCi/g	1.0	EJB	02/19/98	2012	116863	1
Mercury-203	U	0.00	+/- 0.0805	0.100	1.00	pCi/g	1.0					
Neodymium-147	U	-0.260	+/- 0.590	1.03	1.00	pCi/g	1.0					
Neptunium-239	U	0.0503	+/- 0.301	0.543	1.00	pCi/g	1.0					
Niobium-94	U	-0.00548	+/- 0.0552	0.0981	1.00	pCi/g	1.0					
Niobium-95	U	-0.000701	+/- 0.0836	0.129	1.00	pCi/g	1.0					
Potassium-40		21.4	+/- 3.11	0.847	1.00	pCi/g	1.0					
Promethium-144	U	0.0236	+/- 0.0542	0.101	0.100	pCi/g	1.0					
Promethium-146	U	0.0252	+/- 0.0669	0.125	0.100	pCi/g	1.0					
Radium-226		1.22	+/- 0.344	0.177	1.00	pCi/g	1.0					
Radium-228		1.23	+/- 0.481	0.381	1.00	pCi/g	1.0					
Ruthenium-106	U	0.130	+/- 0.577	0.932	0.800	pCi/g	1.0					
Silver-110M	U	0.00492	+/- 0.0576	0.104	1.00	pCi/g	1.0					
Sodium-22	U	-0.0391	+/- 0.0653	0.112	0.700	pCi/g	1.0					
Thallium-208	J	0.329	+/- 0.146	0.115	1.00	pCi/g	1.0					
Thorium-234	U	1.05	+/- 2.00	3.27	1.00	pCi/g	1.0					
Tin-113	U	-0.0137	+/- 0.0681	0.123	1.00	pCi/g	1.0					
Uranium-235	U	0.0828	+/- 0.481	0.550	0.500	pCi/g	1.0					
Yttrium-88	U	0.0424	+/- 0.0530	0.119	0.100	pCi/g	1.0					
Zinc-65	U	-0.0399	+/- 0.161	0.246	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0244	+/- 0.110	0.192	1.00	pCi/g	1.0					

Comments:
Ce-144 and Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 001.003

M = Method	*Method-Description*

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company. L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Idcker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID	: 98A0621 017.051 Room 125 SE
Lab ID	: 9802321-24
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		2.09	+/- 0.418	0.184	1.00	pCi/g	1.0	EJB	02/20/98	0801	116863	1
Americium-241	U	-0.0364	+/- 0.143	0.241	0.400	pCi/g	1.0					
Antimony-124	U	0.0214	+/- 0.0308	0.0591	1.00	pCi/g	1.0					
Antimony-125	U	0.0166	+/- 0.0791	0.140	0.200	pCi/g	1.0					
Barium-133	U	0.0225	+/- 0.0419	0.0682	1.00	pCi/g	1.0					
Barium-140	U	0.100	+/- 0.149	0.307	1.00	pCi/g	1.0					
Beryllium-7	U	-0.222	+/- 0.241	0.415	1.00	pCi/g	1.0					
Bismuth-212		1.33	+/- 0.515	0.416	1.00	pCi/g	1.0					
Bismuth-214		1.17	+/- 0.192	0.102	1.00	pCi/g	1.0					
Cerium-139	U	0.00937	+/- 0.0267	0.0440	1.00	pCi/g	1.0					
Cerium-141	U	0.0118	+/- 0.0479	0.0678	1.00	pCi/g	1.0					
Cerium-144	U	-0.0845	+/- 0.167	0.297	0.500	pCi/g	1.0					
Cesium-134	U	-0.141	+/- 0.0411	0.0527	0.100	pCi/g	1.0					
Cesium-136	U	0.0182	+/- 0.0811	0.147	1.00	pCi/g	1.0					
Cesium-137	U	-0.00606	+/- 0.0340	0.0608	5.00	pCi/g	1.0					
Chromium-51	U	-0.178	+/- 0.304	0.510	1.00	pCi/g	1.0					
Cobalt-56	U	0.00508	+/- 0.0345	0.0628	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0179	+/- 0.0211	0.0372	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0170	+/- 0.0298	0.0509	1.00	pCi/g	1.0					
Cobalt-60	U	0.0236	+/- 0.0320	0.0659	0.100	pCi/g	1.0					
Europium-152	U	0.0401	+/- 0.0811	0.147	0.500	pCi/g	1.0					
Europium-154	U	0.0287	+/- 0.113	0.214	0.200	pCi/g	1.0					
Europium-155	U	0.0613	+/- 0.0916	0.173	0.200	pCi/g	1.0					
Iodine-131	U	0.0383	+/- 0.0648	0.118	5.00	pCi/g	1.0					
Iridium-192	U	0.00920	+/- 0.0296	0.0529	1.00	pCi/g	1.0					
Iron-59	U	0.0481	+/- 0.0701	0.135	1.00	pCi/g	1.0					
Lead-212		1.92	+/- 0.240	0.0935	1.00	pCi/g	1.0					

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Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 017.051

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.22	+/- 0.221	0.109	1.00	pCi/g	1.0					
Manganese-54	U	0.00934	+/- 0.0348	0.0636	0.100	pCi/g	1.0	EJB	02/20/98	0801	116863	1
Mercury-203	U	0.00268	+/- 0.0339	0.0599	1.00	pCi/g	1.0					
Neodymium-147	U	0.0445	+/- 0.352	0.656	1.00	pCi/g	1.0					
Neptunium-239	U	-0.140	+/- 0.153	0.269	1.00	pCi/g	1.0					
Niobium-94	U	0.0251	+/- 0.0316	0.0601	1.00	pCi/g	1.0					
Niobium-95	U	0.0143	+/- 0.0400	0.0665	1.00	pCi/g	1.0					
Potassium-40		24.5	+/- 3.11	0.562	1.00	pCi/g	1.0					
Promethium-144	U	0.00112	+/- 0.0265	0.0486	0.100	pCi/g	1.0					
Promethium-146	U	0.0186	+/- 0.0368	0.0703	0.100	pCi/g	1.0					
Radium-226		1.17	+/- 0.192	0.102	1.00	pCi/g	1.0					
Radium-228		2.09	+/- 0.418	0.184	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0524	+/- 0.263	0.490	0.800	pCi/g	1.0					
Silver-110M	U	0.0163	+/- 0.0303	0.0574	1.00	pCi/g	1.0					
Sodium-22	U	0.0103	+/- 0.0402	0.0763	0.700	pCi/g	1.0					
Thallium-208	J	0.566	+/- 0.107	0.0561	1.00	pCi/g	1.0					
Thorium-234		2.17	+/- 1.70	2.03	1.00	pCi/g	1.0					
Tin-113	U	0.0224	+/- 0.0384	0.0695	1.00	pCi/g	1.0					
Uranium-235	U	0.186	+/- 0.180	0.335	0.500	pCi/g	1.0					
Yttrium-88	U	0.00992	+/- 0.0307	0.0626	0.100	pCi/g	1.0					
Zinc-65	U	-0.0190	+/- 0.0797	0.119	0.200	pCi/g	1.0					
Zirconium-95	U	0.0161	+/- 0.0609	0.112	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 017.051

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID : 98A0621 020.060 Room 109A South
Lab ID : 9802321-25
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.49	+/- 0.366	0.212	1.00	pCi/g	1.0	EJB	02/20/98	0802	116863	1
Americium-241	U	-0.0107	+/- 0.132	0.226	0.400	pCi/g	1.0					
Antimony-124	U	-0.00705	+/- 0.0287	0.0508	1.00	pCi/g	1.0					
Antimony-125	U	0.0441	+/- 0.0686	0.132	0.200	pCi/g	1.0					
Barium-133	U	0.00789	+/- 0.0387	0.0646	1.00	pCi/g	1.0					
Barium-140	U	-0.145	+/- 0.165	0.266	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0744	+/- 0.224	0.401	1.00	pCi/g	1.0					
Bismuth-212		1.03	+/- 0.352	0.411	1.00	pCi/g	1.0					
Bismuth-214		1.02	+/- 0.189	0.0967	1.00	pCi/g	1.0					
Cerium-139	U	-0.00611	+/- 0.0229	0.0407	1.00	pCi/g	1.0					
Cerium-141	U	-0.0395	+/- 0.0470	0.0819	1.00	pCi/g	1.0					
Cerium-144	U	0.110	+/- 0.162	0.302	0.500	pCi/g	1.0					
Cesium-134	U	0.00670	+/- 0.0295	0.0479	0.100	pCi/g	1.0					
Cesium-136	U	0.00683	+/- 0.0682	0.127	1.00	pCi/g	1.0					
Cesium-137	U	-0.0213	+/- 0.0305	0.0512	5.00	pCi/g	1.0					
Chromium-51	U	0.274	+/- 0.271	0.501	1.00	pCi/g	1.0					
Cobalt-56	U	0.00208	+/- 0.0342	0.0536	1.00	pCi/g	1.0					
Cobalt-57	U	-0.000869	+/- 0.0189	0.0346	0.100	pCi/g	1.0					
Cobalt-58	U	0.0176	+/- 0.0307	0.0576	1.00	pCi/g	1.0					
Cobalt-60	U	0.0364	+/- 0.0342	0.0699	0.100	pCi/g	1.0					
Europium-152	U	-0.0250	+/- 0.0839	0.142	0.500	pCi/g	1.0					
Europium-154	U	0.0116	+/- 0.110	0.202	0.200	pCi/g	1.0					
Europium-155	U	0.0227	+/- 0.0808	0.151	0.200	pCi/g	1.0					
Iodine-131	U	0.0118	+/- 0.0579	0.109	5.00	pCi/g	1.0					
Iridium-192	U	-0.00175	+/- 0.0275	0.0476	1.00	pCi/g	1.0					
Iron-59	U	0.0147	+/- 0.0823	0.134	1.00	pCi/g	1.0					
Lead-212		1.57	+/- 0.208	0.0908	1.00	pCi/g	1.0					

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9802321-25

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 020.060

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.21	+/- 0.211	0.102	1.00	pCi/g	1.0					
Manganese-54	U	0.0262	+/- 0.0375	0.0612	0.100	pCi/g	1.0	EJB	02/20/98	0802	116863	1
Mercury-203	U	0.00	+/- 0.0707	0.0513	1.00	pCi/g	1.0					
Neodymium-147	U	-0.0761	+/- 0.336	0.601	1.00	pCi/g	1.0					
Neptunium-239	U	0.0503	+/- 0.154	0.287	1.00	pCi/g	1.0					
Niobium-94	U	0.000501	+/- 0.0280	0.0501	1.00	pCi/g	1.0					
Niobium-95	U	0.000461	+/- 0.0465	0.0715	1.00	pCi/g	1.0					
Potassium-40		25.4	+/- 3.00	0.423	1.00	pCi/g	1.0					
Promethium-144	U	-0.00269	+/- 0.0282	0.0499	0.100	pCi/g	1.0					
Promethium-146	U	0.0217	+/- 0.0335	0.0642	0.100	pCi/g	1.0					
Radium-226		1.02	+/- 0.189	0.0967	1.00	pCi/g	1.0					
Radium-228		1.49	+/- 0.366	0.212	1.00	pCi/g	1.0					
Ruthenium-106	U	0.118	+/- 0.268	0.499	0.800	pCi/g	1.0					
Silver-110M	U	-0.00128	+/- 0.0242	0.0437	1.00	pCi/g	1.0					
Sodium-22	U	0.00397	+/- 0.0393	0.0719	0.700	pCi/g	1.0					
Thallium-208	J	0.503	+/- 0.0982	0.0504	1.00	pCi/g	1.0					
Thorium-234	U	0.415	+/- 1.66	1.92	1.00	pCi/g	1.0					
Tin-113	U	0.0219	+/- 0.0350	0.0670	1.00	pCi/g	1.0					
Uranium-235	U	0.153	+/- 0.174	0.324	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00772	+/- 0.0226	0.0426	0.100	pCi/g	1.0					
Zinc-65	U	0.00656	+/- 0.0938	0.149	0.200	pCi/g	1.0					
Zirconium-95	U	0.0636	+/- 0.0857	0.0997	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID	: 98A0621 020.060
M = Method	**Method-Description**

Notes:
The qualifiers in this report are defined as follows:
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

9802321-25

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
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Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Idecker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID : 98A0621 021.063 Room 109B North
Lab ID : 9802321-26
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.69	+/- 0.404	0.203	1.00	pCi/g	1.0	EJB	02/20/98	0803	116863	1
Americium-241	U	-0.0235	+/- 0.144	0.256	0.400	pCi/g	1.0					
Antimony-124	U	-0.0111	+/- 0.0280	0.0507	1.00	pCi/g	1.0					
Antimony-125	U	0.00392	+/- 0.0777	0.139	0.200	pCi/g	1.0					
Barium-133	U	-0.00703	+/- 0.0350	0.0618	1.00	pCi/g	1.0					
Barium-140	U	0.0389	+/- 0.168	0.301	1.00	pCi/g	1.0					
Beryllium-7	U	-0.247	+/- 0.274	0.442	1.00	pCi/g	1.0					
Bismuth-212	J	0.853	+/- 0.571	0.429	1.00	pCi/g	1.0					
Bismuth-214	U	0.00	+/- 0.204	0.268	1.00	pCi/g	1.0					
Cerium-139	U	0.0168	+/- 0.0224	0.0431	1.00	pCi/g	1.0					
Cerium-141	U	0.00527	+/- 0.0422	0.0798	1.00	pCi/g	1.0					
Cerium-144	U	0.239	+/- 0.207	0.305	0.500	pCi/g	1.0					
Cesium-134	U	-0.0239	+/- 0.0290	0.0429	0.100	pCi/g	1.0					
Cesium-136	U	-0.0306	+/- 0.0762	0.131	1.00	pCi/g	1.0					
Cesium-137	U	0.0121	+/- 0.0320	0.0610	5.00	pCi/g	1.0					
Chromium-51	U	-0.105	+/- 0.258	0.453	1.00	pCi/g	1.0					
Cobalt-56	U	0.00240	+/- 0.0304	0.0564	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0211	+/- 0.0214	0.0346	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0287	+/- 0.0321	0.0532	1.00	pCi/g	1.0					
Cobalt-60	U	0.0303	+/- 0.0299	0.0655	0.100	pCi/g	1.0					
Europium-152	U	0.0439	+/- 0.0767	0.144	0.500	pCi/g	1.0					
Europium-154	U	0.0127	+/- 0.110	0.198	0.200	pCi/g	1.0					
Europium-155	U	0.119	+/- 0.0924	0.169	0.200	pCi/g	1.0					
Iodine-131	U	0.0168	+/- 0.0606	0.111	5.00	pCi/g	1.0					
Iridium-192	U	-0.0131	+/- 0.0257	0.0448	1.00	pCi/g	1.0					
Iron-59	U	0.0149	+/- 0.0812	0.148	1.00	pCi/g	1.0					
Lead-212		1.76	+/- 0.346	0.0835	1.00	pCi/g	1.0					

9802321-26

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 021.063

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.26	+/- 0.228	0.106	1.00	pCi/g	1.0					
Manganese-54	U	0.0398	+/- 0.0484	0.0560	0.100	pCi/g	1.0	EJB	02/20/98	0803	116863	1
Mercury-203	U	0.0140	+/- 0.0314	0.0532	1.00	pCi/g	1.0					
Neodymium-147	U	-0.172	+/- 0.343	0.571	1.00	pCi/g	1.0					
Neptunium-239	U	-0.117	+/- 0.157	0.259	1.00	pCi/g	1.0					
Niobium-94	U	0.00997	+/- 0.0282	0.0536	1.00	pCi/g	1.0					
Niobium-95	U	0.00431	+/- 0.0383	0.0706	1.00	pCi/g	1.0					
Potassium-40		22.3	+/- 2.73	0.599	1.00	pCi/g	1.0					
Promethium-144	U	0.0216	+/- 0.0284	0.0556	0.100	pCi/g	1.0					
Promethium-146	U	0.0313	+/- 0.0337	0.0646	0.100	pCi/g	1.0					
Radium-226		1.13	+/- 0.204	0.0944	1.00	pCi/g	1.0					
Radium-228		1.69	+/- 0.404	0.203	1.00	pCi/g	1.0					
Ruthenium-106	U	0.101	+/- 0.257	0.494	0.800	pCi/g	1.0					
Silver-110M	U	-0.0187	+/- 0.0273	0.0475	1.00	pCi/g	1.0					
Sodium-22	U	0.00463	+/- 0.0392	0.0707	0.700	pCi/g	1.0					
Thallium-208	J	0.585	+/- 0.103	0.0548	1.00	pCi/g	1.0					
Thorium-234	U	1.35	+/- 2.12	1.98	1.00	pCi/g	1.0					
Tin-113	U	0.0251	+/- 0.0350	0.0658	1.00	pCi/g	1.0					
Uranium-235	U	0.0209	+/- 0.177	0.303	0.500	pCi/g	1.0					
Yttrium-88	U	0.00670	+/- 0.0303	0.0612	0.100	pCi/g	1.0					
Zinc-65	U	-0.00526	+/- 0.0885	0.137	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0165	+/- 0.0528	0.0947	1.00	pCi/g	1.0					

Comments:
Bi-214 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idecker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 021.063

M = Method	Method-Description

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden. Colorado 80402-0464
Contact: Ms. Virgene Idcker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 022.066 Room 109B South
Lab ID	: 9802321-27
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.86	+/- 0.386	0.190	1.00	pCi/g	1.0	EJB	02/20/98	0804	116863	1
Americium-241	U	0.0128	+/- 0.0465	0.0800	0.400	pCi/g	1.0					
Antimony-124	U	-0.00624	+/- 0.0279	0.0499	1.00	pCi/g	1.0					
Antimony-125	U	-0.0136	+/- 0.0746	0.127	0.200	pCi/g	1.0					
Barium-133	U	-0.0714	+/- 0.0410	0.0604	1.00	pCi/g	1.0					
Barium-140	U	0.133	+/- 0.180	0.305	1.00	pCi/g	1.0					
Beryllium-7	U	0.0592	+/- 0.230	0.433	1.00	pCi/g	1.0					
Bismuth-212		1.03	+/- 0.536	0.394	1.00	pCi/g	1.0					
Bismuth-214		1.03	+/- 0.207	0.102	1.00	pCi/g	1.0					
Cerium-139	U	-0.00425	+/- 0.0221	0.0395	1.00	pCi/g	1.0					
Cerium-141	U	0.0273	+/- 0.0414	0.0770	1.00	pCi/g	1.0					
Cerium-144	U	-0.0794	+/- 0.146	0.259	0.500	pCi/g	1.0					
Cesium-134	U	0.0198	+/- 0.0265	0.0464	0.100	pCi/g	1.0					
Cesium-136	U	0.00562	+/- 0.0806	0.142	1.00	pCi/g	1.0					
Cesium-137	U	0.00871	+/- 0.0418	0.0570	5.00	pCi/g	1.0					
Chromium-51	U	0.0886	+/- 0.243	0.437	1.00	pCi/g	1.0					
Cobalt-56	U	-0.00201	+/- 0.0308	0.0551	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00682	+/- 0.0172	0.0310	0.100	pCi/g	1.0					
Cobalt-58	U	0.0186	+/- 0.0362	0.0671	1.00	pCi/g	1.0					
Cobalt-60	U	0.00500	+/- 0.0348	0.0656	0.100	pCi/g	1.0					
Europium-152	U	0.0588	+/- 0.0771	0.141	0.500	pCi/g	1.0					
Europium-154	U	0.0448	+/- 0.108	0.207	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.114	0.123	0.200	pCi/g	1.0					
Iodine-131	U	0.0124	+/- 0.0596	0.106	5.00	pCi/g	1.0					
Iridium-192	U	-0.0000413	+/- 0.0246	0.0432	1.00	pCi/g	1.0					
Iron-59	U	-0.0248	+/- 0.0724	0.123	1.00	pCi/g	1.0					
Lead-212		1.80	+/- 0.251	0.0762	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 022.066

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.18	+/- 0.196	0.0982	1.00	pCi/g	1.0					
Manganese-54	U	0.00727	+/- 0.0346	0.0625	0.100	pCi/g	1.0	EJB	02/20/98	0804	116863	1
Mercury-203	U	0.00	+/- 0.0521	0.0482	1.00	pCi/g	1.0					
Neodymium-147	U	0.379	+/- 0.307	0.611	1.00	pCi/g	1.0					
Neptunium-239	U	0.0326	+/- 0.131	0.243	1.00	pCi/g	1.0					
Niobium-94	U	0.00928	+/- 0.0281	0.0521	1.00	pCi/g	1.0					
Niobium-95	U	0.00605	+/- 0.0448	0.0711	1.00	pCi/g	1.0					
Potassium-40		26.9	+/- 3.08	0.520	1.00	pCi/g	1.0					
Promethium-144	U	0.000918	+/- 0.0324	0.0514	0.100	pCi/g	1.0					
Promethium-146	U	0.0302	+/- 0.0523	0.0586	0.100	pCi/g	1.0					
Radium-226		1.03	+/- 0.207	0.102	1.00	pCi/g	1.0					
Radium-228		1.86	+/- 0.386	0.190	1.00	pCi/g	1.0					
Ruthenium-106	U	0.272	+/- 0.228	0.456	0.800	pCi/g	1.0					
Silver-110M	U	-0.0349	+/- 0.0358	0.0499	1.00	pCi/g	1.0					
Sodium-22	U	0.0163	+/- 0.0387	0.0739	0.700	pCi/g	1.0					
Thallium-208	J	0.609	+/- 0.108	0.0522	1.00	pCi/g	1.0					
Thorium-234		1.27	+/- 0.801	0.746	1.00	pCi/g	1.0					
Tin-113	U	-0.0407	+/- 0.0352	0.0549	1.00	pCi/g	1.0					
Uranium-235	U	0.0363	+/- 0.150	0.275	0.500	pCi/g	1.0					
Yttrium-88	U	0.00630	+/- 0.0208	0.0456	0.100	pCi/g	1.0					
Zinc-65	U	0.00394	+/- 0.0844	0.137	0.200	pCi/g	1.0					
Zirconium-95	U	0.113	+/- 0.108	0.115	1.00	pCi/g	1.0					

Comments:
Eu-155 and Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 022.066

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 030.090 Room 111 West Central
Lab ID : 9802321-28
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.46	+/- 0.309	0.170	1.00	pCi/g	1.0	EJB	02/20/98	0805	116863	1
Americium-241	U	-0.00212	+/- 0.0858	0.139	0.400	pCi/g	1.0					
Antimony-124	U	0.00893	+/- 0.0276	0.0493	1.00	pCi/g	1.0					
Antimony-125	U	0.0303	+/- 0.0647	0.114	0.200	pCi/g	1.0					
Barium-133	U	0.0219	+/- 0.0308	0.0524	1.00	pCi/g	1.0					
Barium-140	U	-0.00537	+/- 0.137	0.243	1.00	pCi/g	1.0					
Beryllium-7	U	0.0880	+/- 0.215	0.375	1.00	pCi/g	1.0					
Bismuth-212		1.06	+/- 0.384	0.360	1.00	pCi/g	1.0					
Bismuth-214	J	0.980	+/- 0.180	0.0871	1.00	pCi/g	1.0					
Cerium-139	U	0.0104	+/- 0.0229	0.0392	1.00	pCi/g	1.0					
Cerium-141	U	0.0598	+/- 0.0446	0.0792	1.00	pCi/g	1.0					
Cerium-144	U	0.0363	+/- 0.157	0.270	0.500	pCi/g	1.0					
Cesium-134	U	-0.00940	+/- 0.0283	0.0418	0.100	pCi/g	1.0					
Cesium-136	U	0.0175	+/- 0.0691	0.124	1.00	pCi/g	1.0					
Cesium-137	U	-0.00380	+/- 0.0263	0.0456	5.00	pCi/g	1.0					
Chromium-51	U	0.195	+/- 0.241	0.434	1.00	pCi/g	1.0					
Cobalt-56	U	-0.00769	+/- 0.0274	0.0461	1.00	pCi/g	1.0					
Cobalt-57	U	0.00986	+/- 0.0192	0.0336	0.100	pCi/g	1.0					
Cobalt-58	U	0.00400	+/- 0.0312	0.0472	1.00	pCi/g	1.0					
Cobalt-60	U	0.0197	+/- 0.0321	0.0588	0.100	pCi/g	1.0					
Europium-152	U	-0.0543	+/- 0.0735	0.122	0.500	pCi/g	1.0					
Europium-154	U	0.107	+/- 0.0759	0.166	0.200	pCi/g	1.0					
Europium-155	U	0.131	+/- 0.0803	0.146	0.200	pCi/g	1.0					
Iodine-131	U	0.0178	+/- 0.0557	0.0978	5.00	pCi/g	1.0					
Iridium-192	U	0.0169	+/- 0.0255	0.0431	1.00	pCi/g	1.0					
Iron-59	U	-0.0227	+/- 0.0614	0.105	1.00	pCi/g	1.0					
Lead-212		1.45	+/- 0.184	0.0729	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Idcker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 030.090

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.17	+/- 0.181	0.0942	1.00	pCi/g	1.0					
Manganese-54	U	0.0287	+/- 0.0292	0.0438	0.100	pCi/g	1.0	EJB	02/20/98	0805	116863	1
Mercury-203	U	0.0370	+/- 0.0536	0.0473	1.00	pCi/g	1.0					
Neodymium-147	U	0.102	+/- 0.269	0.492	1.00	pCi/g	1.0					
Neptunium-239	U	0.146	+/- 0.188	0.257	1.00	pCi/g	1.0					
Niobium-94	U	0.0134	+/- 0.0264	0.0470	1.00	pCi/g	1.0					
Niobium-95	U	0.0556	+/- 0.0370	0.0621	1.00	pCi/g	1.0					
Potassium-40		28.0	+/- 3.31	0.397	1.00	pCi/g	1.0					
Promethium-144	U	0.000214	+/- 0.0297	0.0446	0.100	pCi/g	1.0					
Promethium-146	U	-0.00136	+/- 0.0310	0.0526	0.100	pCi/g	1.0					
Radium-226	J	0.980	+/- 0.180	0.0871	1.00	pCi/g	1.0					
Radium-228		1.46	+/- 0.309	0.170	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0355	+/- 0.217	0.378	0.800	pCi/g	1.0					
Silver-110M	U	0.00466	+/- 0.0245	0.0433	1.00	pCi/g	1.0					
Sodium-22	U	0.0384	+/- 0.0269	0.0573	0.700	pCi/g	1.0					
Thallium-208	J	0.429	+/- 0.0817	0.0478	1.00	pCi/g	1.0					
Thorium-234		1.32	+/- 1.21	1.19	1.00	pCi/g	1.0					
Tin-113	U	-0.0176	+/- 0.0308	0.0509	1.00	pCi/g	1.0					
Uranium-235	U	0.0262	+/- 0.164	0.281	0.500	pCi/g	1.0					
Yttrium-88	U	-0.0154	+/- 0.0258	0.0430	0.100	pCi/g	1.0					
Zinc-65	U	0.0314	+/- 0.123	0.122	0.200	pCi/g	1.0					
Zirconium-95	U	0.0502	+/- 0.0634	0.0807	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 030.090

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID : 98A0621 031.093 Room 124 West
Lab ID : 9802321-29
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.51	+/- 0.522	0.381	1.00	pCi/g	1.0	EJB	02/20/98	0807	116863	1
Americium-241	U	0.0305	+/- 0.225	0.366	0.400	pCi/g	1.0					
Antimony-124	U	-0.000430	+/- 0.0603	0.109	1.00	pCi/g	1.0					
Antimony-125	U	0.102	+/- 0.143	0.273	0.200	pCi/g	1.0					
Barium-133	U	0.0491	+/- 0.0542	0.123	1.00	pCi/g	1.0					
Barium-140	U	0.00	+/- 0.759	0.591	1.00	pCi/g	1.0					
Beryllium-7	U	-0.275	+/- 0.481	0.836	1.00	pCi/g	1.0					
Bismuth-212		1.32	+/- 0.903	0.748	1.00	pCi/g	1.0					
Bismuth-214		1.19	+/- 0.320	0.211	1.00	pCi/g	1.0					
Cerium-139	U	-0.00328	+/- 0.0440	0.0776	1.00	pCi/g	1.0					
Cerium-141	U	0.0159	+/- 0.0671	0.151	1.00	pCi/g	1.0					
Cerium-144	U	-0.111	+/- 0.311	0.546	0.500	pCi/g	1.0					
Cesium-134	U	0.0431	+/- 0.0601	0.102	0.100	pCi/g	1.0					
Cesium-136	U	0.0403	+/- 0.138	0.262	1.00	pCi/g	1.0					
Cesium-137	U	-0.00480	+/- 0.0669	0.119	5.00	pCi/g	1.0					
Chromium-51	U	0.492	+/- 0.789	0.903	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0184	+/- 0.0650	0.113	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0247	+/- 0.0390	0.0679	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0298	+/- 0.0663	0.113	1.00	pCi/g	1.0					
Cobalt-60	U	-0.0253	+/- 0.0581	0.102	0.100	pCi/g	1.0					
Europium-152	U	0.110	+/- 0.185	0.294	0.500	pCi/g	1.0					
Europium-154	U	0.0591	+/- 0.175	0.337	0.200	pCi/g	1.0					
Europium-155	U	0.213	+/- 0.215	0.298	0.200	pCi/g	1.0					
Iodine-131	U	0.0257	+/- 0.126	0.206	5.00	pCi/g	1.0					
Iridium-192	U	-0.00798	+/- 0.0612	0.0916	1.00	pCi/g	1.0					
Iron-59	U	-0.0834	+/- 0.136	0.235	1.00	pCi/g	1.0					
Lead-212		1.37	+/- 0.241	0.151	1.00	pCi/g	1.0					

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9802321-29

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 031.093

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.24	+/- 0.285	0.205	1.00	pCi/g	1.0					
Manganese-54	U	-0.0182	+/- 0.0658	0.114	0.100	pCi/g	1.0	EJB	02/20/98	0807	116863	1
Mercury-203	U	0.0710	+/- 0.0780	0.105	1.00	pCi/g	1.0					
Neodymium-147	U	0.0276	+/- 0.700	1.12	1.00	pCi/g	1.0					
Neptunium-239	U	0.113	+/- 0.290	0.528	1.00	pCi/g	1.0					
Niobium-94	U	0.0244	+/- 0.0566	0.105	1.00	pCi/g	1.0					
Niobium-95	U	0.0357	+/- 0.0708	0.132	1.00	pCi/g	1.0					
Potassium-40		26.7	+/- 3.53	0.986	1.00	pCi/g	1.0					
Promethium-144	U	0.0183	+/- 0.0607	0.111	0.100	pCi/g	1.0					
Promethium-146	U	0.000621	+/- 0.0706	0.129	0.100	pCi/g	1.0					
Radium-226		1.19	+/- 0.320	0.211	1.00	pCi/g	1.0					
Radium-228		1.51	+/- 0.522	0.381	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.162	+/- 0.567	0.993	0.800	pCi/g	1.0					
Silver-110M	U	-0.0207	+/- 0.0564	0.0982	1.00	pCi/g	1.0					
Sodium-22	U	0.00880	+/- 0.0640	0.121	0.700	pCi/g	1.0					
Thallium-208	J	0.573	+/- 0.163	0.0993	1.00	pCi/g	1.0					
Thorium-234	U	0.388	+/- 2.65	3.17	1.00	pCi/g	1.0					
Tin-113	U	-0.0257	+/- 0.0659	0.118	1.00	pCi/g	1.0					
Uranium-235	U	0.0913	+/- 0.361	0.549	0.500	pCi/g	1.0					
Yttrium-88	U	0.0586	+/- 0.0628	0.137	0.100	pCi/g	1.0					
Zinc-65	U	-0.0842	+/- 0.151	0.219	0.200	pCi/g	1.0					
Zirconium-95	U	0.0121	+/- 0.109	0.198	1.00	pCi/g	1.0					

Comments:
Ba-140 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 031.093

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Idcker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 034.102 Room 101 A
Lab ID : 9802321-30
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.48	+/- 0.320	0.167	1.00	pCi/g	1.0	EJB	02/20/98	1122	116863	1
Americium-241	U	0.0299	+/- 0.0936	0.128	0.400	pCi/g	1.0					
Antimony-124	U	-0.0141	+/- 0.0248	0.0425	1.00	pCi/g	1.0					
Antimony-125	U	0.0525	+/- 0.0612	0.111	0.200	pCi/g	1.0					
Barium-133	U	0.00450	+/- 0.0300	0.0469	1.00	pCi/g	1.0					
Barium-140	U	-0.0454	+/- 0.125	0.219	1.00	pCi/g	1.0					
Beryllium-7	U	0.156	+/- 0.211	0.376	1.00	pCi/g	1.0					
Bismuth-212	J	0.950	+/- 0.375	0.329	1.00	pCi/g	1.0					
Bismuth-214	J	0.989	+/- 0.160	0.0780	1.00	pCi/g	1.0					
Cerium-139	U	-0.00782	+/- 0.0205	0.0350	1.00	pCi/g	1.0					
Cerium-141	U	0.0366	+/- 0.0406	0.0730	1.00	pCi/g	1.0					
Cerium-144	U	-0.0964	+/- 0.141	0.239	0.500	pCi/g	1.0					
Cesium-134	U	0.00121	+/- 0.0254	0.0392	0.100	pCi/g	1.0					
Cesium-136	U	0.0837	+/- 0.0587	0.113	1.00	pCi/g	1.0					
Cesium-137	U	-0.0143	+/- 0.0247	0.0419	5.00	pCi/g	1.0					
Chromium-51	U	0.0530	+/- 0.232	0.414	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0169	+/- 0.0249	0.0408	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00496	+/- 0.0171	0.0300	0.100	pCi/g	1.0					
Cobalt-58	U	0.00875	+/- 0.0242	0.0382	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00344	+/- 0.0260	0.0451	0.100	pCi/g	1.0					
Europium-152	U	-0.0439	+/- 0.0696	0.102	0.500	pCi/g	1.0					
Europium-154	U	-0.0235	+/- 0.0865	0.147	0.200	pCi/g	1.0					
Europium-155	U	0.0300	+/- 0.0711	0.129	0.200	pCi/g	1.0					
Iodine-131	U	-0.0153	+/- 0.0494	0.0853	5.00	pCi/g	1.0					
Iridium-192	U	0.00477	+/- 0.0225	0.0403	1.00	pCi/g	1.0					
Iron-59	U	-0.0152	+/- 0.0608	0.105	1.00	pCi/g	1.0					
Lead-212		1.55	+/- 0.194	0.0737	1.00	pCi/g	1.0					

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Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 034.102

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.16	+/- 0.176	0.0809	1.00	pCi/g	1.0					
Manganese-54	U	0.0293	+/- 0.0191	0.0439	0.100	pCi/g	1.0	EJB	02/20/98	1122	116863	1
Mercury-203	U	0.0193	+/- 0.0285	0.0466	1.00	pCi/g	1.0					
Neodymium-147	U	0.0609	+/- 0.244	0.448	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0557	+/- 0.130	0.227	1.00	pCi/g	1.0					
Niobium-94	U	0.00268	+/- 0.0239	0.0421	1.00	pCi/g	1.0					
Niobium-95	U	0.0226	+/- 0.0330	0.0526	1.00	pCi/g	1.0					
Potassium-40		28.8	+/- 3.34	0.362	1.00	pCi/g	1.0					
Promethium-144	U	0.00397	+/- 0.0232	0.0411	0.100	pCi/g	1.0					
Promethium-146	U	0.0155	+/- 0.0281	0.0500	0.100	pCi/g	1.0					
Radium-226	J	0.989	+/- 0.160	0.0780	1.00	pCi/g	1.0					
Radium-228		1.48	+/- 0.320	0.167	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.00216	+/- 0.226	0.350	0.800	pCi/g	1.0					
Silver-110M	U	-0.00155	+/- 0.0214	0.0378	1.00	pCi/g	1.0					
Sodium-22	U	-0.00833	+/- 0.0309	0.0526	0.700	pCi/g	1.0					
Thallium-208	J	0.471	+/- 0.0838	0.0389	1.00	pCi/g	1.0					
Thorium-234		1.45	+/- 1.17	1.22	1.00	pCi/g	1.0					
Tin-113	U	-0.000146	+/- 0.0270	0.0473	1.00	pCi/g	1.0					
Uranium-235	U	0.0423	+/- 0.171	0.270	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00295	+/- 0.0219	0.0392	0.100	pCi/g	1.0					
Zinc-65	U	-0.0177	+/- 0.0734	0.108	0.200	pCi/g	1.0					
Zirconium-95	U	0.00296	+/- 0.0418	0.0737	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621 034.102

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 037.111 Room 111 NW Corner
Lab ID	: 9802321-31
Matrix	: Misc.
Date Collected	: 02/10/98
Date Received	: 02/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.64	+/- 0.363	0.194	1.00	pCi/g	1.0	EJB	02/20/98	1347	116863	1
Americium-241	U	0.0350	+/- 0.155	0.255	0.400	pCi/g	1.0					
Antimony-124	U	-0.00804	+/- 0.0318	0.0575	1.00	pCi/g	1.0					
Antimony-125	U	-0.0704	+/- 0.0836	0.135	0.200	pCi/g	1.0					
Barium-133	U	-0.0184	+/- 0.0379	0.0643	1.00	pCi/g	1.0					
Barium-140	U	0.0940	+/- 0.178	0.323	1.00	pCi/g	1.0					
Beryllium-7	U	-0.00174	+/- 0.315	0.490	1.00	pCi/g	1.0					
Bismuth-212	J	0.802	+/- 0.410	0.467	1.00	pCi/g	1.0					
Bismuth-214	U	0.00	+/- 0.199	0.276	1.00	pCi/g	1.0					
Cerium-139	U	-0.00394	+/- 0.0226	0.0411	1.00	pCi/g	1.0					
Cerium-141	U	-0.00153	+/- 0.0481	0.0799	1.00	pCi/g	1.0					
Cerium-144	U	0.00665	+/- 0.174	0.292	0.500	pCi/g	1.0					
Cesium-134	U	0.00124	+/- 0.0341	0.0557	0.100	pCi/g	1.0					
Cesium-136	U	0.0254	+/- 0.0749	0.142	1.00	pCi/g	1.0					
Cesium-137	U	-0.0284	+/- 0.0346	0.0586	5.00	pCi/g	1.0					
Chromium-51	U	0.170	+/- 0.292	0.539	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0181	+/- 0.0424	0.0633	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00310	+/- 0.0217	0.0362	0.100	pCi/g	1.0					
Cobalt-58	U	0.0102	+/- 0.0334	0.0632	1.00	pCi/g	1.0					
Cobalt-60	U	0.00479	+/- 0.0303	0.0602	0.100	pCi/g	1.0					
Europium-152	U	-0.0755	+/- 0.0831	0.136	0.500	pCi/g	1.0					
Europium-154	U	0.0617	+/- 0.119	0.225	0.200	pCi/g	1.0					
Europium-155	U	0.123	+/- 0.151	0.155	0.200	pCi/g	1.0					
Iodine-131	U	0.0403	+/- 0.0677	0.126	5.00	pCi/g	1.0					
Iridium-192	U	-0.0107	+/- 0.0290	0.0503	1.00	pCi/g	1.0					
Iron-59	U	0.0239	+/- 0.0807	0.150	1.00	pCi/g	1.0					
Lead-212		1.51	+/- 0.219	0.0797	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Idecker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621 037.111

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.07	+/- 0.210	0.107	1.00	pCi/g	1.0					
Manganese-54	U	0.00929	+/- 0.0347	0.0646	0.100	pCi/g	1.0	EJB	02/20/98	1347	116863	1
Mercury-203	U	0.00396	+/- 0.0325	0.0531	1.00	pCi/g	1.0					
Neodymium-147	U	0.136	+/- 0.389	0.699	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0766	+/- 0.166	0.271	1.00	pCi/g	1.0					
Niobium-94	U	0.0100	+/- 0.0301	0.0567	1.00	pCi/g	1.0					
Niobium-95	U	0.00	+/- 0.0532	0.0642	1.00	pCi/g	1.0					
Potassium-40		22.8	+/- 2.80	0.612	1.00	pCi/g	1.0					
Promethium-144	U	0.0189	+/- 0.0293	0.0571	0.100	pCi/g	1.0					
Promethium-146	U	-0.0118	+/- 0.0445	0.0756	0.100	pCi/g	1.0					
Radium-226	J	0.938	+/- 0.199	0.110	1.00	pCi/g	1.0					
Radium-228		1.64	+/- 0.363	0.194	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0693	+/- 0.265	0.480	0.800	pCi/g	1.0					
Silver-110M	U	0.0136	+/- 0.0280	0.0544	1.00	pCi/g	1.0					
Sodium-22	U	0.0218	+/- 0.0423	0.0801	0.700	pCi/g	1.0					
Thallium-208	J	0.518	+/- 0.0975	0.0572	1.00	pCi/g	1.0					
Thorium-234	U	1.03	+/- 1.37	2.29	1.00	pCi/g	1.0					
Tin-113	U	0.00537	+/- 0.0381	0.0680	1.00	pCi/g	1.0					
Uranium-235	U	0.189	+/- 0.291	0.294	0.500	pCi/g	1.0					
Yttrium-88	U	0.00395	+/- 0.0304	0.0617	0.100	pCi/g	1.0					
Zinc-65	U	-0.0136	+/- 0.0867	0.132	0.200	pCi/g	1.0					
Zirconium-95	U	0.0564	+/- 0.0661	0.129	1.00	pCi/g	1.0					

Comments:

Nb-95 not quantified due to interference.

Bi-214 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621 037.111
M = Method	**Method-Description**

Notes:
The qualifiers in this report are defined as follows:
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Client: Kaiser Hill Company, L.L.C.
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Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 011.033 Room 127
Lab ID : 9802321-32
Matrix : Misc.
Date Collected : 02/10/98
Date Received : 02/11/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.45	+/- 0.304	0.188	1.00	pCi/g	1.0	EJB	02/20/98	1540	116863	1
Americium-241	U	-0.0000518	+/- 0.118	0.189	0.400	pCi/g	1.0					
Antimony-124	U	-0.0111	+/- 0.0313	0.0544	1.00	pCi/g	1.0					
Antimony-125	U	0.00639	+/- 0.0741	0.137	0.200	pCi/g	1.0					
Barium-133	U	-0.000738	+/- 0.0370	0.0607	1.00	pCi/g	1.0					
Barium-140	U	-0.205	+/- 0.182	0.274	1.00	pCi/g	1.0					
Beryllium-7	U	0.0420	+/- 0.234	0.435	1.00	pCi/g	1.0					
Bismuth-212		1.22	+/- 0.435	0.366	1.00	pCi/g	1.0					
Bismuth-214		1.06	+/- 0.198	0.0943	1.00	pCi/g	1.0					
Cerium-139	U	-0.0205	+/- 0.0234	0.0403	1.00	pCi/g	1.0					
Cerium-141	U	0.0127	+/- 0.0449	0.0824	1.00	pCi/g	1.0					
Cerium-144	U	0.0129	+/- 0.153	0.281	0.500	pCi/g	1.0					
Cesium-134	U	0.0148	+/- 0.0309	0.0510	0.100	pCi/g	1.0					
Cesium-136	U	0.00253	+/- 0.0714	0.132	1.00	pCi/g	1.0					
Cesium-137	U	0.000667	+/- 0.0359	0.0562	5.00	pCi/g	1.0					
Chromium-51	U	-0.109	+/- 0.287	0.484	1.00	pCi/g	1.0					
Cobalt-56	U	0.0130	+/- 0.0314	0.0579	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0119	+/- 0.0193	0.0345	0.100	pCi/g	1.0					
Cobalt-58	U	0.0112	+/- 0.0321	0.0587	1.00	pCi/g	1.0					
Cobalt-60	U	0.00249	+/- 0.0323	0.0600	0.100	pCi/g	1.0					
Europium-152	U	0.00613	+/- 0.0812	0.141	0.500	pCi/g	1.0					
Europium-154	U	-0.0744	+/- 0.109	0.180	0.200	pCi/g	1.0					
Europium-155	U	0.109	+/- 0.114	0.145	0.200	pCi/g	1.0					
Iodine-131	U	0.0118	+/- 0.0594	0.112	5.00	pCi/g	1.0					
Iridium-192	U	0.0115	+/- 0.0284	0.0506	1.00	pCi/g	1.0					
Iron-59	U	-0.0651	+/- 0.0814	0.136	1.00	pCi/g	1.0					
Lead-212		1.44	+/- 0.223	0.0805	1.00	pCi/g	1.0					

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9802321-32

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 011.033

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.23	+/- 0.234	0.0997	1.00	pCi/g	1.0					
Manganese-54	U	0.00518	+/- 0.0347	0.0615	0.100	pCi/g	1.0	EJB	02/20/98	1540	116863	1
Mercury-203	U	-0.0148	+/- 0.0337	0.0505	1.00	pCi/g	1.0					
Neodymium-147	U	-0.233	+/- 0.357	0.610	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0255	+/- 0.144	0.263	1.00	pCi/g	1.0					
Niobium-94	U	0.00317	+/- 0.0292	0.0522	1.00	pCi/g	1.0					
Niobium-95	U	0.00169	+/- 0.0429	0.0664	1.00	pCi/g	1.0					
Potassium-40		22.0	+/- 2.67	0.682	1.00	pCi/g	1.0					
Promethium-144	U	0.0267	+/- 0.0303	0.0573	0.100	pCi/g	1.0					
Promethium-146	U	0.0248	+/- 0.0347	0.0665	0.100	pCi/g	1.0					
Radium-226		1.06	+/- 0.198	0.0943	1.00	pCi/g	1.0					
Radium-228		1.45	+/- 0.304	0.188	1.00	pCi/g	1.0					
Ruthenium-106	U	0.129	+/- 0.248	0.467	0.800	pCi/g	1.0					
Silver-110M	U	-0.0146	+/- 0.0277	0.0472	1.00	pCi/g	1.0					
Sodium-22	U	-0.0266	+/- 0.0387	0.0643	0.700	pCi/g	1.0					
Thallium-208	J	0.388	+/- 0.0839	0.0548	1.00	pCi/g	1.0					
Thorium-234		2.56	+/- 1.83	1.71	1.00	pCi/g	1.0					
Tin-113	U	-0.0111	+/- 0.0373	0.0672	1.00	pCi/g	1.0					
Uranium-235	U	0.0685	+/- 0.166	0.305	0.500	pCi/g	1.0					
Yttrium-88	U	-0.0177	+/- 0.0308	0.0534	0.100	pCi/g	1.0					
Zinc-65	U	-0.0176	+/- 0.0925	0.141	0.200	pCi/g	1.0					
Zirconium-95	U	0.0292	+/- 0.0621	0.114	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621 011.033

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998 Page 1 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Radiological													
QC488189	BLANK	116863											
Cesium-134						-0.00810	pCi/g				EJB	02/20/98	1348
Cesium-137						0.0126	pCi/g						
Accuracy, Actinium-228						0.0705	pCi/g						
Accuracy, Americium-241						0.0500	pCi/g						
Accuracy, Antimony-124						0.0218	pCi/g						
Accuracy, Antimony-125						0.0455	pCi/g						
Accuracy, Barium-133						0.0218	pCi/g						
Accuracy, Barium-140						0.0871	pCi/g						
Accuracy, Beryllium-7						0.150	pCi/g						
Accuracy, Bismuth-212						0.142	pCi/g						
Accuracy, Bismuth-214						0.0414	pCi/g						
Accuracy, Cerium-139						0.0153	pCi/g						
Accuracy, Cerium-141						0.0320	pCi/g						
Accuracy, Cerium-144						0.101	pCi/g						
Accuracy, Cesium-134						0.0200	pCi/g						
Accuracy, Cesium-136						0.0387	pCi/g						
Accuracy, Cesium-137						0.0227	pCi/g						
Accuracy, Chromium-51						0.171	pCi/g						
Accuracy, Cobalt-56						0.0232	pCi/g						
Accuracy, Cobalt-57						0.0122	pCi/g						
Accuracy, Cobalt-58						0.0170	pCi/g						
Accuracy, Cobalt-60						0.0186	pCi/g						
Accuracy, Europium-152						0.0598	pCi/g						
Accuracy, Europium-154						0.0551	pCi/g						
Accuracy, Europium-155						0.0505	pCi/g						
Accuracy, Iodine-131						0.0332	pCi/g						
Accuracy, Iridium-192						0.0172	pCi/g						
Accuracy, Iron-59						0.0333	pCi/g						
Accuracy, Lead-212						0.0415	pCi/g						
Accuracy, Lead-214						0.0363	pCi/g						
Accuracy, Manganese-54						0.0194	pCi/g						
Accuracy, Mercury-203						0.0182	pCi/g						
Accuracy, Neodymium-147						0.167	pCi/g						
Accuracy, Neptunium-239						0.0915	pCi/g						
Accuracy, Niobium-94						0.0180	pCi/g						
Accuracy, Niobium-95						0.0182	pCi/g						
Accuracy, Potassium-40						0.302	pCi/g						
Accuracy, Promethium-144						0.0179	pCi/g						

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QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Accuracy, Promethium-146						0.0232	pCi/g				EJB	02/20/98	1348
Accuracy, Radium-226						0.0414	pCi/g						
Accuracy, Radium-228						0.0705	pCi/g						
Accuracy, Ruthenium-106						0.156	pCi/g						
Accuracy, Silver-110M						0.0154	pCi/g						
Accuracy, Sodium-22						0.0197	pCi/g						
Accuracy, Thallium-208						0.0298	pCi/g						
Accuracy, Thorium-234						0.612	pCi/g						
Accuracy, Tin-113						0.0198	pCi/g						
Accuracy, Uranium-235						0.125	pCi/g						
Accuracy, Yttrium-88						0.0192	pCi/g						
Accuracy, Zinc-65						0.0420	pCi/g						
Accuracy, Zirconium-95						0.0295	pCi/g						
Actinium-228						0.0434	pCi/g						
Americium-241						0.0400	pCi/g						
Antimony-124						-0.0207	pCi/g						
Antimony-125						0.0146	pCi/g						
Barium-133						-0.00371	pCi/g						
Barium-140						-0.0477	pCi/g						
Beryllium-7						0.166	pCi/g						
Bismuth-212						0.0349	pCi/g						
Bismuth-214						0.00606	pCi/g						
Cerium-139						-0.00301	pCi/g						
Cerium-141						0.00789	pCi/g						
Cerium-144						0.0343	pCi/g						
Cesium-136						-0.00140	pCi/g						
Chromium-51						-0.123	pCi/g						
Cobalt-56						0.000851	pCi/g						
Cobalt-57						-0.00756	pCi/g						
Cobalt-58						-0.0122	pCi/g						
Cobalt-60						0.0223	pCi/g						
Europium-152						0.0352	pCi/g						
Europium-154						-0.0138	pCi/g						
Europium-155						0.0295	pCi/g						
Iodine-131						0.0156	pCi/g						
Iridium-192						0.0138	pCi/g						
Iron-59						-0.0221	pCi/g						
Lead-212						0.0129	pCi/g						
Lead-214						0.0168	pCi/g						
Manganese-54						0.0201	pCi/g						

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Mercury-203						-0.00581	pCi/g				EJB	02/20/98	1348
Neodymium-147						-0.0475	pCi/g						
Neptunium-239						0.0178	pCi/g						
Niobium-94						0.00654	pCi/g						
Niobium-95						0.00413	pCi/g						
Potassium-40						0.0322	pCi/g						
Promethium-144						0.00387	pCi/g						
Promethium-146						0.0135	pCi/g						
Radium-226						0.00606	pCi/g						
Radium-228						0.0434	pCi/g						
Ruthenium-106						-0.154	pCi/g						
Silver-110M						-0.00987	pCi/g						
Sodium-22						-0.00479	pCi/g						
Thallium-208						0.0181	pCi/g						
Thorium-234						0.390	pCi/g						
Tin-113						-0.00463	pCi/g						
Uranium-235						0.0309	pCi/g						
Yttrium-88						0.0174	pCi/g						
Zinc-65						0.0341	pCi/g						
Zirconium-95						0.0174	pCi/g						
QC488190	9802321-32DUP	116863											
Cesium-134				0.0148		-0.0231	pCi/g	0.00			EJB	02/19/98	1959
Cesium-137				0.000667		-0.00889	pCi/g	0.00					
Accuracy, Actinium-228				0.304		0.287	pCi/g	5.61					
Accuracy, Americium-241				0.118		0.0766	pCi/g	0.00					
Accuracy, Antimony-124				0.0313		0.0241	pCi/g	0.00					
Accuracy, Antimony-125				0.0741		0.0587	pCi/g	0.00					
Accuracy, Barium-133				0.0370		0.0293	pCi/g	0.00					
Accuracy, Barium-140				0.182		0.118	pCi/g	0.00					
Accuracy, Beryllium-7				0.234		0.182	pCi/g	0.00					
Accuracy, Bismuth-212				0.435		0.388	pCi/g	11.4					
Accuracy, Bismuth-214				0.198		0.168	pCi/g	16.5					
Accuracy, Cerium-139				0.0234		0.0201	pCi/g	0.00					
Accuracy, Cerium-141				0.0449		0.0544	pCi/g	0.00					
Accuracy, Cerium-144				0.153		0.131	pCi/g	0.00					
Accuracy, Cesium-134				0.0309		0.0252	pCi/g	0.00					
Accuracy, Cesium-136				0.0714		0.0515	pCi/g	0.00					
Accuracy, Cesium-137				0.0359		0.0230	pCi/g	0.00					
Accuracy, Chromium-51				0.287		0.209	pCi/g	0.00					
Accuracy, Cobalt-56				0.0314		0.0230	pCi/g	0.00					

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998 Page 4 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Accuracy, Cobalt-57				0.0193		0.0165	pCi/g	0.00			EJB	02/19/98	1959
Accuracy, Cobalt-58				0.0321		0.0239	pCi/g	0.00					
Accuracy, Cobalt-60				0.0323		0.0238	pCi/g	0.00					
Accuracy, Europium-152				0.0812		0.0605	pCi/g	0.00					
Accuracy, Europium-154				0.109		0.0779	pCi/g	0.00					
Accuracy, Europium-155				0.114		0.0681	pCi/g	0.00					
Accuracy, Iodine-131				0.0594		0.0448	pCi/g	0.00					
Accuracy, Iridium-192				0.0284		0.0211	pCi/g	0.00					
Accuracy, Iron-59				0.0814		0.0628	pCi/g	0.00					
Accuracy, Lead-212				0.223		0.177	pCi/g	22.8					
Accuracy, Lead-214				0.234		0.176	pCi/g	28.2					
Accuracy, Manganese-54				0.0347		0.0246	pCi/g	0.00					
Accuracy, Mercury-203				0.0337		0.0442	pCi/g	200					
Accuracy, Neodymium-147				0.357		0.235	pCi/g	0.00					
Accuracy, Neptunium-239				0.144		0.119	pCi/g	0.00					
Accuracy, Niobium-94				0.0292		0.0215	pCi/g	0.00					
Accuracy, Niobium-95				0.0429		0.0506	pCi/g	0.00					
Accuracy, Potassium-40				2.67		2.95	pCi/g	9.82					
Accuracy, Promethium-144				0.0303		0.0214	pCi/g	0.00					
Accuracy, Promethium-146				0.0347		0.0266	pCi/g	0.00					
Accuracy, Radium-226				0.198		0.168	pCi/g	16.5					
Accuracy, Radium-228				0.304		0.287	pCi/g	5.61					
Accuracy, Ruthenium-106				0.248		0.184	pCi/g	0.00					
Accuracy, Silver-110M				0.0277		0.0197	pCi/g	0.00					
Accuracy, Sodium-22				0.0387		0.0278	pCi/g	0.00					
Accuracy, Thallium-208				0.0839		0.0759	pCi/g	10.0					
Accuracy, Thorium-234				1.83		1.13	pCi/g	47.6					
Accuracy, Tin-113				0.0373		0.0271	pCi/g	0.00					
Accuracy, Uranium-235				0.166		0.251	pCi/g	0.00					
Accuracy, Yttrium-88				0.0308		0.0218	pCi/g	0.00					
Accuracy, Zinc-65				0.0925		0.0644	pCi/g	0.00					
Accuracy, Zirconium-95				0.0621		0.0411	pCi/g	0.00					
Actinium-228				1.45		1.39	pCi/g	4.09					
Americium-241				-5.18E-05		0.0144	pCi/g	0.00					
Antimony-124				-0.0111		-0.0126	pCi/g	0.00					
Antimony-125				0.00639		0.0156	pCi/g	0.00					
Barium-133				-0.000738		0.0270	pCi/g	0.00					
Barium-140				-0.205		0.0511	pCi/g	0.00					
Beryllium-7				0.0420		-0.131	pCi/g	0.00					
Bismuth-212				1.22		0.733	pCi/g	49.6					

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998 Page 5 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Bismuth-214				1.06		0.984	pCi/g	7.59			EJB	02/19/98	1959
Cerium-139				-0.0205		-0.0129	pCi/g	0.00					
Cerium-141				0.0127		0.0634	pCi/g	0.00					
Cerium-144				0.0129		0.0461	pCi/g	0.00					
Cesium-136				0.00253		0.0330	pCi/g	0.00					
Chromium-51				-0.109		0.0152	pCi/g	0.00					
Cobalt-56				0.0130		-0.0146	pCi/g	0.00					
Cobalt-57				-0.0119		0.0123	pCi/g	0.00					
Cobalt-58				0.0112		-0.0256	pCi/g	0.00					
Cobalt-60				0.00249		-0.0103	pCi/g	0.00					
Europium-152				0.00613		0.0213	pCi/g	0.00					
Europium-154				-0.0744		-0.0141	pCi/g	0.00					
Europium-155				0.109		0.0746	pCi/g	0.00					
Iodine-131				0.0118		0.00843	pCi/g	0.00					
Iridium-192				0.0115		0.00540	pCi/g	0.00					
Iron-59				-0.0651		-0.0372	pCi/g	0.00					
Lead-212				1.44		1.42	pCi/g	1.40					
Lead-214				1.23		1.12	pCi/g	9.55					
Manganese-54				0.00518		-0.00241	pCi/g	0.00					
Mercury-203				-0.0148		0.00	pCi/g	0.00					
Neodymium-147				-0.233		-0.206	pCi/g	0.00					
Neptunium-239				-0.0255		0.0130	pCi/g	0.00					
Niobium-94				0.00317		0.000603	pCi/g	0.00					
Niobium-95				0.00169		0.00	pCi/g	0.00					
Potassium-40				22.0		24.9	pCi/g	12.6					
Promethium-144				0.0267		0.00598	pCi/g	0.00					
Promethium-146				0.0248		0.0216	pCi/g	0.00					
Radium-226				1.06		0.984	pCi/g	7.59					
Radium-228				1.45		1.39	pCi/g	4.09					
Ruthenium-106				0.129		-0.0852	pCi/g	0.00					
Silver-110M				-0.0146		-0.00426	pCi/g	0.00					
Sodium-22				-0.0266		-0.00483	pCi/g	0.00					
Thallium-208				0.388		0.431	pCi/g	10.4					
Thorium-234				2.56		1.29	pCi/g	66.2					
Tin-113				-0.0111		-0.00533	pCi/g	0.00					
Uranium-235				0.0685		0.306	pCi/g	200					
Yttrium-88				-0.0177		0.00180	pCi/g	0.00					
Zinc-65				-0.0176		0.0544	pCi/g	0.00					
Zirconium-95				0.0292		0.0246	pCi/g	0.00					
QC488191	LCS	116863											

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802321-17 Report Date: February 24, 1998 Page 6 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Cesium-134			(nom_conc = 0)			0.0611	pCi/g				EJB	02/20/98	1540
Cesium-137			441			465	pCi/g		105	(75.0 - 125.)	EJB	02/20/98	1540

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte < RL (Report Limit)
U indicates presence of analyte < DL (Detect Limit)

n/a indicates that spike recovery limits do not apply when sample concentration exceeds spike conc by a factor of 4 or more

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idecker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-007.021 Room 103 South
Lab ID	: 9802251-15
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.49	+/- 0.305	0.172	1.00	pCi/g	1.0	EJB	02/17/98	1026	116681	1
Americium-241	U	-0.0650	+/- 0.0897	0.162	0.400	pCi/g	1.0					
Antimony-124	U	-0.00228	+/- 0.0221	0.0393	1.00	pCi/g	1.0					
Antimony-125	U	-0.00748	+/- 0.0581	0.0976	0.200	pCi/g	1.0					
Barium-133	U	-0.000936	+/- 0.0319	0.0482	1.00	pCi/g	1.0					
Barium-140	U	-0.0417	+/- 0.141	0.249	1.00	pCi/g	1.0					
Beryllium-7	U	-0.00351	+/- 0.191	0.346	1.00	pCi/g	1.0					
Bismuth-212	J	0.896	+/- 0.324	0.319	1.00	pCi/g	1.0					
Bismuth-214	J	0.883	+/- 0.142	0.0746	1.00	pCi/g	1.0					
Cerium-139	U	-0.00164	+/- 0.0179	0.0316	1.00	pCi/g	1.0					
Cerium-141	U	-0.00109	+/- 0.0380	0.0673	1.00	pCi/g	1.0					
Cerium-144	U	0.177	+/- 0.150	0.196	0.500	pCi/g	1.0					
Cesium-134	U	-0.0102	+/- 0.0228	0.0344	0.100	pCi/g	1.0					
Cesium-136	U	0.0279	+/- 0.0629	0.113	1.00	pCi/g	1.0					
Cesium-137	U	0.0176	+/- 0.0230	0.0427	5.00	pCi/g	1.0					
Chromium-51	U	0.00	+/- 0.293	0.367	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0112	+/- 0.0239	0.0405	1.00	pCi/g	1.0					
Cobalt-57	U	0.0161	+/- 0.0153	0.0282	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0139	+/- 0.0234	0.0394	1.00	pCi/g	1.0					
Cobalt-60	U	0.00126	+/- 0.0238	0.0437	0.100	pCi/g	1.0					
Europium-152	U	0.0155	+/- 0.0604	0.105	0.500	pCi/g	1.0					
Europium-154	U	-0.105	+/- 0.0796	0.127	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.107	0.110	0.200	pCi/g	1.0					
Iodine-131	U	0.0299	+/- 0.0619	0.109	5.00	pCi/g	1.0					
Iridium-192	U	-0.00416	+/- 0.0227	0.0344	1.00	pCi/g	1.0					
Iron-59	U	-0.00286	+/- 0.0657	0.0985	1.00	pCi/g	1.0					
Lead-212		1.60	+/- 0.192	0.0597	1.00	pCi/g	1.0					

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Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-007.021

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.971	+/- 0.156	0.0811	1.00	pCi/g	1.0					
Manganese-54	U	0.0123	+/- 0.0240	0.0434	0.100	pCi/g	1.0	EJB	02/17/98	1026	116681	1
Mercury-203	U	0.0395	+/- 0.0366	0.0445	1.00	pCi/g	1.0					
Neodymium-147	U	0.354	+/- 0.316	0.595	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0456	+/- 0.114	0.202	1.00	pCi/g	1.0					
Niobium-94	U	0.0198	+/- 0.0221	0.0408	1.00	pCi/g	1.0					
Niobium-95	U	0.0411	+/- 0.0336	0.0570	1.00	pCi/g	1.0					
Potassium-40		26.7	+/- 3.10	0.382	1.00	pCi/g	1.0					
Promethium-144	U	-0.00157	+/- 0.0220	0.0388	0.100	pCi/g	1.0					
Promethium-146	U	0.0127	+/- 0.0264	0.0490	0.100	pCi/g	1.0					
Radium-226	J	0.883	+/- 0.142	0.0746	1.00	pCi/g	1.0					
Radium-228		1.49	+/- 0.305	0.172	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0594	+/- 0.196	0.356	0.800	pCi/g	1.0					
Silver-110M	U	-0.0178	+/- 0.0200	0.0334	1.00	pCi/g	1.0					
Sodium-22	U	-0.0374	+/- 0.0283	0.0452	0.700	pCi/g	1.0					
Thallium-208	J	0.469	+/- 0.0812	0.0397	1.00	pCi/g	1.0					
Thorium-234	U	1.27	+/- 1.34	1.35	1.00	pCi/g	1.0					
Tin-113	U	-0.00698	+/- 0.0285	0.0477	1.00	pCi/g	1.0					
Uranium-235	U	0.0675	+/- 0.132	0.236	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00929	+/- 0.0210	0.0364	0.100	pCi/g	1.0					
Zinc-65	U	0.0391	+/- 0.0645	0.0957	0.200	pCi/g	1.0					
Zirconium-95	U	0.0129	+/- 0.0462	0.0829	1.00	pCi/g	1.0					

Comments:
Cr-51 and Eu-155 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621-007.021

M = Method **Method-Description**

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998 Page 1 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Radiological													
QC487528	BLANK	116681											
Cesium-134						-0.00651	pCi/g				EJB	02/17/98	1450
Cesium-137						-0.00793	pCi/g						
Accuracy, Actinium-228						0.0648	pCi/g						
Accuracy, Americium-241						0.0356	pCi/g						
Accuracy, Antimony-124						0.0146	pCi/g						
Accuracy, Antimony-125						0.0325	pCi/g						
Accuracy, Barium-133						0.0168	pCi/g						
Accuracy, Barium-140						0.0524	pCi/g						
Accuracy, Beryllium-7						0.0967	pCi/g						
Accuracy, Bismuth-212						0.103	pCi/g						
Accuracy, Bismuth-214						0.0300	pCi/g						
Accuracy, Cerium-139						0.0110	pCi/g						
Accuracy, Cerium-141						0.0186	pCi/g						
Accuracy, Cerium-144						0.0721	pCi/g						
Accuracy, Cesium-134						0.0142	pCi/g						
Accuracy, Cesium-136						0.0221	pCi/g						
Accuracy, Cesium-137						0.0163	pCi/g						
Accuracy, Chromium-51						0.107	pCi/g						
Accuracy, Cobalt-56						0.0143	pCi/g						
Accuracy, Cobalt-57						0.00902	pCi/g						
Accuracy, Cobalt-58						0.0160	pCi/g						
Accuracy, Cobalt-60						0.0145	pCi/g						
Accuracy, Europium-152						0.0344	pCi/g						
Accuracy, Europium-154						0.0414	pCi/g						
Accuracy, Europium-155						0.0342	pCi/g						
Accuracy, Iodine-131						0.0195	pCi/g						
Accuracy, Iridium-192						0.0119	pCi/g						
Accuracy, Iron-59						0.0260	pCi/g						
Accuracy, Lead-212						0.0376	pCi/g						
Accuracy, Lead-214						0.0426	pCi/g						
Accuracy, Manganese-54						0.0137	pCi/g						
Accuracy, Mercury-203						0.0123	pCi/g						
Accuracy, Neodymium-147						0.107	pCi/g						
Accuracy, Neptunium-239						0.0676	pCi/g						
Accuracy, Niobium-94						0.0135	pCi/g						
Accuracy, Niobium-95						0.0144	pCi/g						
Accuracy, Potassium-40						0.185	pCi/g						
Accuracy, Promethium-144						0.0134	pCi/g						

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Accuracy, Promethium-146						0.0155	pCi/g				EJB	02/17/98	1450
Accuracy, Radium-226						0.0300	pCi/g						
Accuracy, Radium-228						0.0648	pCi/g						
Accuracy, Ruthenium-106						0.115	pCi/g						
Accuracy, Silver-110M						0.0120	pCi/g						
Accuracy, Sodium-22						0.0148	pCi/g						
Accuracy, Thallium-208						0.0210	pCi/g						
Accuracy, Thorium-234						0.605	pCi/g						
Accuracy, Tin-113						0.0154	pCi/g						
Accuracy, Uranium-235						0.0775	pCi/g						
Accuracy, Yttrium-88						0.0121	pCi/g						
Accuracy, Zinc-65						0.0271	pCi/g						
Accuracy, Zirconium-95						0.0221	pCi/g						
Actinium-228						0.0437	pCi/g						
Americium-241						0.000405	pCi/g						
Antimony-124						-0.00115	pCi/g						
Antimony-125						-0.00689	pCi/g						
Barium-133						-0.00473	pCi/g						
Barium-140						0.0158	pCi/g						
Beryllium-7						0.0379	pCi/g						
Bismuth-212						-0.00765	pCi/g						
Bismuth-214						0.0152	pCi/g						
Cerium-139						-0.0175	pCi/g						
Cerium-141						-0.0128	pCi/g						
Cerium-144						-0.00779	pCi/g						
Cesium-136						-0.00195	pCi/g						
Chromium-51						0.0244	pCi/g						
Cobalt-56						-0.000761	pCi/g						
Cobalt-57						0.000820	pCi/g						
Cobalt-58						-0.00840	pCi/g						
Cobalt-60						0.0000540	pCi/g						
Europium-152						-0.00333	pCi/g						
Europium-154						-0.00114	pCi/g						
Europium-155						0.00972	pCi/g						
Iodine-131						0.00717	pCi/g						
Iridium-192						0.00245	pCi/g						
Iron-59						-0.0325	pCi/g						
Lead-212						0.0236	pCi/g						
Lead-214						0.00260	pCi/g						
Manganese-54						-0.00986	pCi/g						

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Mercury-203						-0.00583	pCi/g				EJB	02/17/98	1450
Neodymium-147						-0.0224	pCi/g						
Neptunium-239						-0.0226	pCi/g						
Niobium-94						-0.00202	pCi/g						
Niobium-95						0.00	pCi/g						
Potassium-40						0.254	pCi/g						
Promethium-144						0.00129	pCi/g						
Promethium-146						-0.00502	pCi/g						
Radium-226						0.0152	pCi/g						
Radium-228						0.0437	pCi/g						
Ruthenium-106						0.00961	pCi/g						
Silver-110M						0.0114	pCi/g						
Sodium-22						-0.000342	pCi/g						
Thallium-208						0.0183	pCi/g						
Thorium-234						0.146	pCi/g						
Tin-113						-0.00802	pCi/g						
Uranium-235						0.0738	pCi/g						
Yttrium-88						0.0110	pCi/g						
Zinc-65						-0.00121	pCi/g						
Zirconium-95						0.00718	pCi/g						
QC487529	9802251-28DUP	116681											
Cesium-134				0.0164		-0.0575	pCi/g	0.00			EJB	02/17/98	1023
Cesium-137				0.00279		-0.0175	pCi/g	0.00					
Accuracy, Actinium-228				0.325		0.311	pCi/g	4.34					
Accuracy, Americium-241				0.228		0.0904	pCi/g	0.00					
Accuracy, Antimony-124				0.0526		0.0240	pCi/g	0.00					
Accuracy, Antimony-125				0.111		0.0568	pCi/g	0.00					
Accuracy, Barium-133				0.0569		0.0301	pCi/g	0.00					
Accuracy, Barium-140				0.295		0.146	pCi/g	0.00					
Accuracy, Beryllium-7				0.391		0.193	pCi/g	0.00					
Accuracy, Bismuth-212				0.710		0.366	pCi/g	63.9					
Accuracy, Bismuth-214				0.292		0.158	pCi/g	60.0					
Accuracy, Cerium-139				0.0373		0.0188	pCi/g	0.00					
Accuracy, Cerium-141				0.0804		0.0376	pCi/g	0.00					
Accuracy, Cerium-144				0.236		0.126	pCi/g	0.00					
Accuracy, Cesium-134				0.0493		0.0248	pCi/g	0.00					
Accuracy, Cesium-136				0.115		0.0674	pCi/g	0.00					
Accuracy, Cesium-137				0.0453		0.0251	pCi/g	0.00					
Accuracy, Chromium-51				0.411		0.242	pCi/g	0.00					
Accuracy, Cobalt-56				0.0501		0.0261	pCi/g	0.00					

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998 Page 4 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Accuracy, Cobalt-57				0.0284		0.0157	pCi/g	0.00			EJB	02/17/98	1023
Accuracy, Cobalt-58				0.0439		0.0241	pCi/g	0.00					
Accuracy, Cobalt-60				0.0423		0.0253	pCi/g	0.00					
Accuracy, Europium-152				0.116		0.0664	pCi/g	0.00					
Accuracy, Europium-154				0.140		0.0834	pCi/g	0.00					
Accuracy, Europium-155				0.151		0.0964	pCi/g	0.00					
Accuracy, Iodine-131				0.117		0.0625	pCi/g	0.00					
Accuracy, Iridium-192				0.0389		0.0229	pCi/g	0.00					
Accuracy, Iron-59				0.0991		0.0590	pCi/g	0.00					
Accuracy, Lead-212				0.214		0.209	pCi/g	2.17					
Accuracy, Lead-214				0.234		0.181	pCi/g	25.3					
Accuracy, Manganese-54				0.0456		0.0286	pCi/g	0.00					
Accuracy, Mercury-203				0.0439		0.0425	pCi/g	200					
Accuracy, Neodymium-147				0.616		0.387	pCi/g	0.00					
Accuracy, Neptunium-239				0.217		0.112	pCi/g	0.00					
Accuracy, Niobium-94				0.0421		0.0220	pCi/g	0.00					
Accuracy, Niobium-95				0.0623		0.0339	pCi/g	0.00					
Accuracy, Potassium-40				2.73		2.83	pCi/g	3.34					
Accuracy, Promethium-144				0.0413		0.0236	pCi/g	0.00					
Accuracy, Promethium-146				0.0565		0.0269	pCi/g	0.00					
Accuracy, Radium-226				0.292		0.158	pCi/g	60.0					
Accuracy, Radium-228				0.325		0.311	pCi/g	4.34					
Accuracy, Ruthenium-106				0.374		0.196	pCi/g	0.00					
Accuracy, Silver-110M				0.0420		0.0232	pCi/g	0.00					
Accuracy, Sodium-22				0.0510		0.0298	pCi/g	0.00					
Accuracy, Thallium-208				0.120		0.0816	pCi/g	38.4					
Accuracy, Thorium-234				2.81		1.19	pCi/g	200					
Accuracy, Tin-113				0.0495		0.0273	pCi/g	0.00					
Accuracy, Uranium-235				0.248		0.131	pCi/g	0.00					
Accuracy, Yttrium-88				0.0377		0.0205	pCi/g	0.00					
Accuracy, Zinc-65				0.113		0.0566	pCi/g	0.00					
Accuracy, Zirconium-95				0.0848		0.0601	pCi/g	0.00					
Actinium-228				1.23		1.59	pCi/g	25.0					
Americium-241				0.0122		-0.00891	pCi/g	0.00					
Antimony-124				0.0383		-0.00823	pCi/g	0.00					
Antimony-125				-0.00737		-0.0339	pCi/g	0.00					
Barium-133				0.0181		0.0274	pCi/g	0.00					
Barium-140				0.141		0.0861	pCi/g	0.00					
Beryllium-7				-0.360		-0.131	pCi/g	0.00					
Bismuth-212				1.25		0.682	pCi/g	59.0					

ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998

Sample/Parameter	Type	Batch	NOM	Sample	Qual QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Bismuth-214				0.971	0.965	pCi/g	0.640			EJB	02/17/98	1023
Cerium-139				0.0342	0.00778	pCi/g	0.00					
Cerium-141				0.0604	0.0213	pCi/g	0.00					
Cerium-144				-0.0703	-0.0556	pCi/g	0.00					
Cesium-136				-0.107	-0.0237	pCi/g	0.00					
Chromium-51				-0.115	-0.0182	pCi/g	0.00					
Cobalt-56				0.0336	-0.0215	pCi/g	0.00					
Cobalt-57				-0.00645	0.0181	pCi/g	0.00					
Cobalt-58				0.0305	0.000536	pCi/g	0.00					
Cobalt-60				-0.0226	-0.00871	pCi/g	0.00					
Europium-152				0.0140	0.0653	pCi/g	0.00					
Europium-154				0.00914	-0.0471	pCi/g	0.00					
Europium-155				0.129	0.00	pCi/g	0.00					
Iodine-131				0.0566	0.0184	pCi/g	0.00					
Iridium-192				0.000103	-0.00834	pCi/g	0.00					
Iron-59				0.00438	-0.0303	pCi/g	0.00					
Lead-212				1.23	1.61	pCi/g	26.8					
Lead-214				1.18	1.15	pCi/g	2.23					
Manganese-54				0.0328	0.0310	pCi/g	0.00					
Mercury-203				0.0468	0.00	pCi/g	0.00					
Neodymium-147				0.0640	0.493	pCi/g	0.00					
Neptunium-239				-0.0920	-0.00920	pCi/g	0.00					
Niobium-94				0.000572	0.00513	pCi/g	0.00					
Niobium-95				-0.0290	0.00695	pCi/g	0.00					
Potassium-40				21.9	25.4	pCi/g	14.8					
Promethium-144				-0.0128	-0.00274	pCi/g	0.00					
Promethium-146				-0.0364	0.00960	pCi/g	0.00					
Radium-226				0.971	0.965	pCi/g	0.640					
Radium-228				1.23	1.59	pCi/g	25.0					
Ruthenium-106				0.304	0.0836	pCi/g	0.00					
Silver-110M				-0.0219	-0.00720	pCi/g	0.00					
Sodium-22				-0.00563	-0.0168	pCi/g	0.00					
Thallium-208				0.520	0.464	pCi/g	11.4					
Thorium-234				3.59	0.833	pCi/g	200					
Tin-113				-0.00323	-0.0112	pCi/g	0.00					
Uranium-235				0.225	-0.00867	pCi/g	0.00					
Yttrium-88				0.0164	-0.0149	pCi/g	0.00					
Zinc-65				-0.00618	-0.0161	pCi/g	0.00					
Zirconium-95				-0.0496	0.0732	pCi/g	0.00					
QC487530	LCS	116681										

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QC Summary Report

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Lab. Sample ID: 9802251-15 Report Date: February 24, 1998 Page 6 of 6

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Cesium-134		(nom_conc = 0)				-0.115	pCi/g				EJB	02/17/98	1450
Cesium-137			441			446	pCi/g		101	(75.0 - 125.)	EJB	02/17/98	1450

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte < RL (Report Limit)
U indicates presence of analyte < DL (Detect Limit)

n/a indicates that spike recovery limits do not apply when
sample concentration exceeds spike conc by a factor of 4 or more

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-013.039 Room 103A West Center
Lab ID : 9802251-17
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.75	+/- 0.306	0.130	1.00	pCi/g	1.0	EJB	02/17/98	1027	116681	1
Americium-241	U	-0.000673	+/- 0.0971	0.173	0.400	pCi/g	1.0					
Antimony-124	U	0.0272	+/- 0.0207	0.0404	1.00	pCi/g	1.0					
Antimony-125	U	0.00361	+/- 0.0535	0.0938	0.200	pCi/g	1.0					
Barium-133	U	-0.00263	+/- 0.0231	0.0407	1.00	pCi/g	1.0					
Barium-140	U	0.118	+/- 0.147	0.256	1.00	pCi/g	1.0					
Beryllium-7	U	0.0822	+/- 0.183	0.326	1.00	pCi/g	1.0					
Bismuth-212		1.00	+/- 0.313	0.288	1.00	pCi/g	1.0					
Bismuth-214	J	0.654	+/- 0.124	0.0672	1.00	pCi/g	1.0					
Cerium-139	U	-0.00159	+/- 0.0145	0.0268	1.00	pCi/g	1.0					
Cerium-141	U	-0.00190	+/- 0.0306	0.0569	1.00	pCi/g	1.0					
Cerium-144	U	-0.104	+/- 0.117	0.188	0.500	pCi/g	1.0					
Cesium-134	U	0.00520	+/- 0.0197	0.0326	0.100	pCi/g	1.0					
Cesium-136	U	0.0158	+/- 0.0526	0.0961	1.00	pCi/g	1.0					
Cesium-137	U	-0.00899	+/- 0.0205	0.0363	5.00	pCi/g	1.0					
Chromium-51	U	0.151	+/- 0.192	0.354	1.00	pCi/g	1.0					
Cobalt-56	U	0.0188	+/- 0.0197	0.0381	1.00	pCi/g	1.0					
Cobalt-57	U	0.00260	+/- 0.0137	0.0235	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0181	+/- 0.0211	0.0354	1.00	pCi/g	1.0					
Cobalt-60	U	0.00208	+/- 0.0219	0.0409	0.100	pCi/g	1.0					
Europium-152	U	-0.0289	+/- 0.0519	0.0891	0.500	pCi/g	1.0					
Europium-154	U	-0.0430	+/- 0.0771	0.126	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.117	0.101	0.200	pCi/g	1.0					
Iodine-131	U	-0.0466	+/- 0.0530	0.0885	5.00	pCi/g	1.0					
Iridium-192	U	-0.0151	+/- 0.0186	0.0317	1.00	pCi/g	1.0					
Iron-59	U	-0.00315	+/- 0.0539	0.0939	1.00	pCi/g	1.0					
Lead-212		1.62	+/- 0.213	0.0540	1.00	pCi/g	1.0					

9802251-17

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-013.039

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.719	+/- 0.132	0.0656	1.00	pCi/g	1.0					
Manganese-54	U	0.0413	+/- 0.0232	0.0452	0.100	pCi/g	1.0	EJB	02/17/98	1027	116681	1
Mercury-203	U	0.0000416	+/- 0.0239	0.0384	1.00	pCi/g	1.0					
Neodymium-147	U	-0.145	+/- 0.283	0.468	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0542	+/- 0.103	0.171	1.00	pCi/g	1.0					
Niobium-94	U	-0.00789	+/- 0.0210	0.0369	1.00	pCi/g	1.0					
Niobium-95	U	0.00490	+/- 0.0286	0.0517	1.00	pCi/g	1.0					
Potassium-40		24.7	+/- 2.68	0.316	1.00	pCi/g	1.0					
Promethium-144	U	0.00163	+/- 0.0205	0.0371	0.100	pCi/g	1.0					
Promethium-146	U	-0.00564	+/- 0.0244	0.0419	0.100	pCi/g	1.0					
Radium-226	J	0.654	+/- 0.124	0.0672	1.00	pCi/g	1.0					
Radium-228		1.75	+/- 0.306	0.130	1.00	pCi/g	1.0					
Ruthenium-106	U	0.107	+/- 0.179	0.337	0.800	pCi/g	1.0					
Silver-110M	U	0.00321	+/- 0.0182	0.0336	1.00	pCi/g	1.0					
Sodium-22	U	-0.0154	+/- 0.0276	0.0451	0.700	pCi/g	1.0					
Thallium-208	J	0.522	+/- 0.0798	0.0390	1.00	pCi/g	1.0					
Thorium-234	U	0.312	+/- 1.29	1.40	1.00	pCi/g	1.0					
Tin-113	U	-0.00685	+/- 0.0253	0.0436	1.00	pCi/g	1.0					
Uranium-235	U	0.0803	+/- 0.118	0.203	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00997	+/- 0.0183	0.0313	0.100	pCi/g	1.0					
Zinc-65	U	0.0162	+/- 0.0577	0.0911	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0148	+/- 0.0413	0.0725	1.00	pCi/g	1.0					

Comments:
Eu-155 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-013.039

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-014.042 Room 103A SE Corner
Lab ID : 9802251-18
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.24	+/- 0.270	0.148	1.00	pCi/g	1.0	EJB	02/17/98	1028	116681	1
Americium-241	U	-0.110	+/- 0.182	0.290	0.400	pCi/g	1.0					
Antimony-124	U	-0.00595	+/- 0.0232	0.0402	1.00	pCi/g	1.0					
Antimony-125	U	0.0369	+/- 0.0579	0.107	0.200	pCi/g	1.0					
Barium-133	U	0.000127	+/- 0.0320	0.0477	1.00	pCi/g	1.0					
Barium-140	U	0.0102	+/- 0.144	0.256	1.00	pCi/g	1.0					
Beryllium-7	U	0.0131	+/- 0.193	0.345	1.00	pCi/g	1.0					
Bismuth-212	J	0.902	+/- 0.395	0.324	1.00	pCi/g	1.0					
Bismuth-214	J	0.822	+/- 0.140	0.0810	1.00	pCi/g	1.0					
Cerium-139	U	0.00674	+/- 0.0186	0.0327	1.00	pCi/g	1.0					
Cerium-141	U	-0.00464	+/- 0.0381	0.0663	1.00	pCi/g	1.0					
Cerium-144	U	-0.0110	+/- 0.130	0.227	0.500	pCi/g	1.0					
Cesium-134	U	-0.0435	+/- 0.0240	0.0369	0.100	pCi/g	1.0					
Cesium-136	U	0.0440	+/- 0.0698	0.130	1.00	pCi/g	1.0					
Cesium-137	U	-0.0157	+/- 0.0242	0.0404	5.00	pCi/g	1.0					
Chromium-51	U	-0.0224	+/- 0.240	0.403	1.00	pCi/g	1.0					
Cobalt-56	U	0.0106	+/- 0.0267	0.0473	1.00	pCi/g	1.0					
Cobalt-57	U	-0.000940	+/- 0.0155	0.0273	0.100	pCi/g	1.0					
Cobalt-58	U	0.0357	+/- 0.0255	0.0461	1.00	pCi/g	1.0					
Cobalt-60	U	0.0273	+/- 0.0262	0.0514	0.100	pCi/g	1.0					
Europium-152	U	-0.0322	+/- 0.0646	0.105	0.500	pCi/g	1.0					
Europium-154	U	0.0613	+/- 0.0770	0.147	0.200	pCi/g	1.0					
Europium-155	U	0.110	+/- 0.0929	0.121	0.200	pCi/g	1.0					
Iodine-131	U	-0.00528	+/- 0.0664	0.111	5.00	pCi/g	1.0					
Iridium-192	U	0.0211	+/- 0.0233	0.0409	1.00	pCi/g	1.0					
Iron-59	U	0.0341	+/- 0.0591	0.110	1.00	pCi/g	1.0					
Lead-212		1.26	+/- 0.164	0.0698	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-014.042

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.900	+/- 0.155	0.0740	1.00	pCi/g	1.0					
Manganese-54	U	-0.00100	+/- 0.0249	0.0428	0.100	pCi/g	1.0	EJB	02/17/98	1028	116681	1
Mercury-203	U	-0.00897	+/- 0.0299	0.0443	1.00	pCi/g	1.0					
Neodymium-147	U	0.101	+/- 0.327	0.589	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0403	+/- 0.117	0.204	1.00	pCi/g	1.0					
Niobium-94	U	0.00652	+/- 0.0230	0.0406	1.00	pCi/g	1.0					
Niobium-95	U	0.0349	+/- 0.0344	0.0568	1.00	pCi/g	1.0					
Potassium-40		25.0	+/- 2.86	0.425	1.00	pCi/g	1.0					
Promethium-144	U	-0.000877	+/- 0.0227	0.0395	0.100	pCi/g	1.0					
Promethium-146	U	0.00581	+/- 0.0259	0.0469	0.100	pCi/g	1.0					
Radium-226	J	0.822	+/- 0.140	0.0810	1.00	pCi/g	1.0					
Radium-228		1.24	+/- 0.270	0.148	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0870	+/- 0.185	0.314	0.800	pCi/g	1.0					
Silver-110M	U	0.00494	+/- 0.0211	0.0376	1.00	pCi/g	1.0					
Sodium-22	U	0.0219	+/- 0.0275	0.0525	0.700	pCi/g	1.0					
Thallium-208	J	0.400	+/- 0.0725	0.0380	1.00	pCi/g	1.0					
Thorium-234	U	0.899	+/- 2.09	2.07	1.00	pCi/g	1.0					
Tin-113	U	-0.000110	+/- 0.0280	0.0503	1.00	pCi/g	1.0					
Uranium-235	U	0.125	+/- 0.132	0.236	0.500	pCi/g	1.0					
Yttrium-88	U	-0.0188	+/- 0.0227	0.0356	0.100	pCi/g	1.0					
Zinc-65	U	-0.0322	+/- 0.0711	0.105	0.200	pCi/g	1.0					
Zirconium-95	U	0.0229	+/- 0.0489	0.0873	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Idekcr
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621-014.042

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-018.054 Room 125 SW
Lab ID	: 9802251-19
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.33	+/- 0.268	0.128	1.00	pCi/g	1.0	EJB	02/17/98	1030	116681	1
Americium-241	U	-0.0961	+/- 0.126	0.189	0.400	pCi/g	1.0					
Antimony-124	U	-0.00497	+/- 0.0191	0.0339	1.00	pCi/g	1.0					
Antimony-125	U	-0.0249	+/- 0.0483	0.0801	0.200	pCi/g	1.0					
Barium-133	U	0.00931	+/- 0.0247	0.0390	1.00	pCi/g	1.0					
Barium-140	U	-0.106	+/- 0.119	0.196	1.00	pCi/g	1.0					
Beryllium-7	U	0.0288	+/- 0.169	0.290	1.00	pCi/g	1.0					
Bismuth-212	J	0.890	+/- 0.353	0.261	1.00	pCi/g	1.0					
Bismuth-214	J	0.904	+/- 0.140	0.0603	1.00	pCi/g	1.0					
Cerium-139	U	-0.00903	+/- 0.0173	0.0271	1.00	pCi/g	1.0					
Cerium-141	U	0.0185	+/- 0.0293	0.0556	1.00	pCi/g	1.0					
Cerium-144	U	0.0220	+/- 0.105	0.191	0.500	pCi/g	1.0					
Cesium-134	U	-0.00290	+/- 0.0185	0.0291	0.100	pCi/g	1.0					
Cesium-136	U	0.0211	+/- 0.0515	0.0930	1.00	pCi/g	1.0					
Cesium-137	J	0.0583	+/- 0.0430	0.0375	5.00	pCi/g	1.0					
Chromium-51	U	-0.0244	+/- 0.194	0.335	1.00	pCi/g	1.0					
Cobalt-56	U	0.00218	+/- 0.0208	0.0371	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00585	+/- 0.0130	0.0233	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00990	+/- 0.0197	0.0338	1.00	pCi/g	1.0					
Cobalt-60	U	0.00830	+/- 0.0214	0.0385	0.100	pCi/g	1.0					
Europium-152	U	-0.0289	+/- 0.0506	0.0850	0.500	pCi/g	1.0					
Europium-154	U	0.0264	+/- 0.0519	0.118	0.200	pCi/g	1.0					
Europium-155	U	0.0886	+/- 0.0780	0.0992	0.200	pCi/g	1.0					
Iodine-131	U	0.0358	+/- 0.0791	0.0897	5.00	pCi/g	1.0					
Iridium-192	U	-0.00549	+/- 0.0183	0.0313	1.00	pCi/g	1.0					
Iron-59	U	0.00737	+/- 0.0472	0.0833	1.00	pCi/g	1.0					
Lead-212		1.40	+/- 0.192	0.0574	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-018.054

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.15	+/- 0.176	0.0628	1.00	pCi/g	1.0					
Manganese-54	U	0.0354	+/- 0.0247	0.0368	0.100	pCi/g	1.0	EJB	02/17/98	1030	116681	1
Mercury-203	U	0.00	+/- 0.0337	0.0358	1.00	pCi/g	1.0					
Neodymium-147	U	0.127	+/- 0.267	0.495	1.00	pCi/g	1.0					
Neptunium-239	U	0.0298	+/- 0.0984	0.181	1.00	pCi/g	1.0					
Niobium-94	U	0.0180	+/- 0.0177	0.0332	1.00	pCi/g	1.0					
Niobium-95	U	0.00950	+/- 0.0253	0.0409	1.00	pCi/g	1.0					
Potassium-40		24.0	+/- 2.63	0.306	1.00	pCi/g	1.0					
Promethium-144	U	0.00421	+/- 0.0174	0.0315	0.100	pCi/g	1.0					
Promethium-146	U	0.00226	+/- 0.0227	0.0390	0.100	pCi/g	1.0					
Radium-226	J	0.904	+/- 0.140	0.0603	1.00	pCi/g	1.0					
Radium-228		1.33	+/- 0.268	0.128	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0694	+/- 0.166	0.291	0.800	pCi/g	1.0					
Silver-110M	U	-0.00151	+/- 0.0193	0.0304	1.00	pCi/g	1.0					
Sodium-22	U	0.00943	+/- 0.0186	0.0442	0.700	pCi/g	1.0					
Thallium-208	J	0.386	+/- 0.0631	0.0323	1.00	pCi/g	1.0					
Thorium-234	U	0.775	+/- 1.28	1.53	1.00	pCi/g	1.0					
Tin-113	U	-0.0144	+/- 0.0251	0.0418	1.00	pCi/g	1.0					
Uranium-235	U	0.0990	+/- 0.147	0.205	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00535	+/- 0.0188	0.0334	0.100	pCi/g	1.0					
Zinc-65	U	-0.00672	+/- 0.0538	0.0805	0.200	pCi/g	1.0					
Zirconium-95	U	0.0607	+/- 0.0638	0.0703	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-018.054

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-019.057 Room 109A North
Lab ID : 9802251-20
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228	J	0.862	+/- 0.230	0.137	1.00	pCi/g	1.0	EJB	02/17/98	1031	116681	1
Americium-241	U	-0.00721	+/- 0.0299	0.0478	0.400	pCi/g	1.0					
Antimony-124	U	-0.0119	+/- 0.0224	0.0380	1.00	pCi/g	1.0					
Antimony-125	U	0.0195	+/- 0.0559	0.0954	0.200	pCi/g	1.0					
Barium-133	U	-0.00970	+/- 0.0270	0.0390	1.00	pCi/g	1.0					
Barium-140	U	-0.0608	+/- 0.133	0.226	1.00	pCi/g	1.0					
Beryllium-7	U	-0.00251	+/- 0.204	0.322	1.00	pCi/g	1.0					
Bismuth-212	J	0.547	+/- 0.351	0.294	1.00	pCi/g	1.0					
Bismuth-214	J	0.498	+/- 0.126	0.0798	1.00	pCi/g	1.0					
Cerium-139	U	-0.0107	+/- 0.0148	0.0247	1.00	pCi/g	1.0					
Cerium-141	U	0.0121	+/- 0.0317	0.0557	1.00	pCi/g	1.0					
Cerium-144	U	0.00850	+/- 0.0984	0.172	0.500	pCi/g	1.0					
Cesium-134	U	0.0102	+/- 0.0197	0.0359	0.100	pCi/g	1.0					
Cesium-136	U	-0.0671	+/- 0.0693	0.107	1.00	pCi/g	1.0					
Cesium-137	U	0.0210	+/- 0.0419	0.0400	5.00	pCi/g	1.0					
Chromium-51	U	-0.114	+/- 0.197	0.319	1.00	pCi/g	1.0					
Cobalt-56	U	-0.00873	+/- 0.0261	0.0440	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00278	+/- 0.0119	0.0206	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00314	+/- 0.0243	0.0421	1.00	pCi/g	1.0					
Cobalt-60	U	0.0198	+/- 0.0201	0.0416	0.100	pCi/g	1.0					
Europium-152	U	-0.0262	+/- 0.0533	0.0868	0.500	pCi/g	1.0					
Europium-154	U	-0.0108	+/- 0.0719	0.129	0.200	pCi/g	1.0					
Europium-155	U	0.0267	+/- 0.0550	0.0838	0.200	pCi/g	1.0					
Iodine-131	U	-0.0177	+/- 0.0564	0.0929	5.00	pCi/g	1.0					
Iridium-192	U	0.0100	+/- 0.0188	0.0327	1.00	pCi/g	1.0					
Iron-59	U	0.0268	+/- 0.0543	0.0983	1.00	pCi/g	1.0					
Lead-212	J	0.799	+/- 0.118	0.0563	1.00	pCi/g	1.0					

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Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-019.057

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.599	+/- 0.114	0.0662	1.00	pCi/g	1.0					
Manganese-54	U	0.0233	+/- 0.0293	0.0378	0.100	pCi/g	1.0	EJB	02/17/98	1031	116681	1
Mercury-203	U	0.00	+/- 0.0341	0.0357	1.00	pCi/g	1.0					
Neodymium-147	U	-0.172	+/- 0.288	0.490	1.00	pCi/g	1.0					
Neptunium-239	U	0.0472	+/- 0.0889	0.159	1.00	pCi/g	1.0					
Niobium-94	U	0.00	+/- 0.0273	0.0383	1.00	pCi/g	1.0					
Niobium-95	U	-0.0123	+/- 0.0314	0.0459	1.00	pCi/g	1.0					
Potassium-40		20.1	+/- 2.25	0.371	1.00	pCi/g	1.0					
Promethium-144	U	-0.0148	+/- 0.0220	0.0364	0.100	pCi/g	1.0					
Promethium-146	U	0.00955	+/- 0.0240	0.0440	0.100	pCi/g	1.0					
Radium-226	J	0.498	+/- 0.126	0.0798	1.00	pCi/g	1.0					
Radium-228	J	0.862	+/- 0.230	0.137	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.102	+/- 0.225	0.332	0.800	pCi/g	1.0					
Silver-110M	U	-0.0301	+/- 0.0239	0.0376	1.00	pCi/g	1.0					
Sodium-22	U	-0.00399	+/- 0.0257	0.0459	0.700	pCi/g	1.0					
Thallium-208	J	0.265	+/- 0.0598	0.0366	1.00	pCi/g	1.0					
Thorium-234	J	0.606	+/- 0.487	0.490	1.00	pCi/g	1.0					
Tin-113	U	0.00307	+/- 0.0257	0.0433	1.00	pCi/g	1.0					
Uranium-235	U	0.0953	+/- 0.112	0.197	0.500	pCi/g	1.0					
Yttrium-88	U	-0.0104	+/- 0.0185	0.0312	0.100	pCi/g	1.0					
Zinc-65	U	-0.0420	+/- 0.0661	0.0960	0.200	pCi/g	1.0					
Zirconium-95	U	0.0341	+/- 0.0424	0.0789	1.00	pCi/g	1.0					

Comments:

Hg-203 not quantified due to interference.

Nb-94 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-019.057

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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in accordance with General Engineering Laboratories
standard operating procedures. Please direct
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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID : 98A0621-005.015 Room 112 NW Corner
Lab ID : 9802251-21
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		2.72	+/- 0.448	0.119	1.00	pCi/g	1.0	EJB	02/17/98	1032	116681	1
Americium-241	U	0.0314	+/- 0.0591	0.108	0.400	pCi/g	1.0					
Antimony-124	U	0.00505	+/- 0.0210	0.0366	1.00	pCi/g	1.0					
Antimony-125	U	0.00229	+/- 0.0469	0.0795	0.200	pCi/g	1.0					
Barium-133	U	-0.00475	+/- 0.0253	0.0377	1.00	pCi/g	1.0					
Barium-140	U	-0.0209	+/- 0.124	0.215	1.00	pCi/g	1.0					
Beryllium-7	U	0.0523	+/- 0.175	0.296	1.00	pCi/g	1.0					
Bismuth-212		1.72	+/- 0.344	0.252	1.00	pCi/g	1.0					
Bismuth-214	J	0.672	+/- 0.118	0.0625	1.00	pCi/g	1.0					
Cerium-139	U	0.00670	+/- 0.0173	0.0294	1.00	pCi/g	1.0					
Cerium-141	U	0.0191	+/- 0.0369	0.0597	1.00	pCi/g	1.0					
Cerium-144	U	-0.120	+/- 0.121	0.199	0.500	pCi/g	1.0					
Cesium-134	U	-0.0103	+/- 0.0214	0.0313	0.100	pCi/g	1.0					
Cesium-136	U	-0.0183	+/- 0.0502	0.0856	1.00	pCi/g	1.0					
Cesium-137	U	-0.0214	+/- 0.0186	0.0302	5.00	pCi/g	1.0					
Chromium-51	U	0.0543	+/- 0.190	0.332	1.00	pCi/g	1.0					
Cobalt-56	U	-0.00467	+/- 0.0211	0.0351	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00587	+/- 0.0165	0.0251	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00781	+/- 0.0196	0.0325	1.00	pCi/g	1.0					
Cobalt-60	U	0.0102	+/- 0.0201	0.0356	0.100	pCi/g	1.0					
Europium-152	U	-0.00776	+/- 0.0514	0.0879	0.500	pCi/g	1.0					
Europium-154	U	0.0140	+/- 0.0612	0.106	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.0878	0.0996	0.200	pCi/g	1.0					
Iodine-131	U	-0.00385	+/- 0.0531	0.0907	5.00	pCi/g	1.0					
Iridium-192	U	-0.00359	+/- 0.0175	0.0301	1.00	pCi/g	1.0					
Iron-59	U	0.000221	+/- 0.0514	0.0764	1.00	pCi/g	1.0					
Lead-212		2.98	+/- 0.338	0.0544	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company. L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-005.015

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.763	+/- 0.133	0.0616	1.00	pCi/g	1.0					
Manganese-54	U	0.0164	+/- 0.0462	0.0324	0.100	pCi/g	1.0	EJB	02/17/98	1032	116681	1
Mercury-203	U	0.00	+/- 0.0328	0.0415	1.00	pCi/g	1.0					
Neodymium-147	U	0.0137	+/- 0.246	0.435	1.00	pCi/g	1.0					
Neptunium-239	U	0.00	+/- 0.159	0.181	1.00	pCi/g	1.0					
Niobium-94	U	-0.00837	+/- 0.0189	0.0317	1.00	pCi/g	1.0					
Niobium-95	U	0.0255	+/- 0.0296	0.0454	1.00	pCi/g	1.0					
Potassium-40		24.6	+/- 2.81	0.293	1.00	pCi/g	1.0					
Promethium-144	U	0.0171	+/- 0.0186	0.0329	0.100	pCi/g	1.0					
Promethium-146	U	0.00867	+/- 0.0232	0.0396	0.100	pCi/g	1.0					
Radium-226	J	0.672	+/- 0.118	0.0625	1.00	pCi/g	1.0					
Radium-228		2.72	+/- 0.448	0.119	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0472	+/- 0.167	0.286	0.800	pCi/g	1.0					
Silver-110M	U	0.0134	+/- 0.0174	0.0310	1.00	pCi/g	1.0					
Sodium-22	U	0.00457	+/- 0.0219	0.0379	0.700	pCi/g	1.0					
Thallium-208	J	0.838	+/- 0.108	0.0317	1.00	pCi/g	1.0					
Thorium-234	U	0.775	+/- 0.930	0.947	1.00	pCi/g	1.0					
Tin-113	U	0.0104	+/- 0.0261	0.0396	1.00	pCi/g	1.0					
Uranium-235	U	0.0739	+/- 0.143	0.214	0.500	pCi/g	1.0					
Yttrium-88	U	-0.000550	+/- 0.0178	0.0314	0.100	pCi/g	1.0					
Zinc-65	U	-0.00539	+/- 0.0529	0.0777	0.200	pCi/g	1.0					
Zirconium-95	U	0.0456	+/- 0.0452	0.0673	1.00	pCi/g	1.0					

Comments:

Eu-155 not quantified due to interference.

Hg-203 and Np-239 not quantified due to low abundance.

M = Method	Method-Description
M 1	HASL 300

9802251-21

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-005.015
M = Method	**Method-Description**

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
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Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company. L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples, Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-004.012 Room 112 SW Corner
Lab ID : 9802251-22
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.58	+/- 0.456	0.289	1.00	pCi/g	1.0	EJB	02/17/98	1033	116681	1
Americium-241	U	0.0179	+/- 0.159	0.256	0.400	pCi/g	1.0					
Antimony-124	U	-0.0297	+/- 0.0545	0.0794	1.00	pCi/g	1.0					
Antimony-125	U	0.0536	+/- 0.103	0.189	0.200	pCi/g	1.0					
Barium-133	U	0.00565	+/- 0.0514	0.0816	1.00	pCi/g	1.0					
Barium-140	U	-0.0581	+/- 0.268	0.471	1.00	pCi/g	1.0					
Beryllium-7	U	-0.252	+/- 0.392	0.576	1.00	pCi/g	1.0					
Bismuth-212		1.16	+/- 0.728	0.561	1.00	pCi/g	1.0					
Bismuth-214		1.22	+/- 0.248	0.141	1.00	pCi/g	1.0					
Cerium-139	U	0.0244	+/- 0.0320	0.0572	1.00	pCi/g	1.0					
Cerium-141	U	0.0473	+/- 0.0665	0.119	1.00	pCi/g	1.0					
Cerium-144	U	-0.0354	+/- 0.223	0.392	0.500	pCi/g	1.0					
Cesium-134	U	0.00651	+/- 0.0446	0.0691	0.100	pCi/g	1.0					
Cesium-136	U	-0.0590	+/- 0.108	0.188	1.00	pCi/g	1.0					
Cesium-137	U	0.0151	+/- 0.0439	0.0789	5.00	pCi/g	1.0					
Chromium-51	U	-0.196	+/- 0.399	0.667	1.00	pCi/g	1.0					
Cobalt-56	U	-0.0638	+/- 0.0466	0.0717	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00263	+/- 0.0282	0.0499	0.100	pCi/g	1.0					
Cobalt-58	U	-0.0337	+/- 0.0450	0.0742	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00669	+/- 0.0411	0.0632	0.100	pCi/g	1.0					
Europium-152	U	-0.00647	+/- 0.125	0.186	0.500	pCi/g	1.0					
Europium-154	U	0.102	+/- 0.126	0.242	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.216	0.208	0.200	pCi/g	1.0					
Iodine-131	U	0.0481	+/- 0.114	0.209	5.00	pCi/g	1.0					
Iridium-192	U	-0.0162	+/- 0.0386	0.0648	1.00	pCi/g	1.0					
Iron-59	U	0.0354	+/- 0.0954	0.177	1.00	pCi/g	1.0					
Lead-212		1.71	+/- 0.250	0.107	1.00	pCi/g	1.0					

9802251-22

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-004.012

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.01	+/- 0.214	0.133	1.00	pCi/g	1.0					
Manganese-54	U	0.0287	+/- 0.0453	0.0796	0.100	pCi/g	1.0	EJB	02/17/98	1033	116681	1
Mercury-203	U	0.0492	+/- 0.0612	0.0745	1.00	pCi/g	1.0					
Neodymium-147	U	0.110	+/- 0.556	1.00	1.00	pCi/g	1.0					
Neptunium-239	U	0.0799	+/- 0.211	0.380	1.00	pCi/g	1.0					
Niobium-94	U	-0.0130	+/- 0.0392	0.0673	1.00	pCi/g	1.0					
Niobium-95	U	0.0134	+/- 0.0567	0.0882	1.00	pCi/g	1.0					
Potassium-40		23.1	+/- 2.80	0.630	1.00	pCi/g	1.0					
Promethium-144	U	0.0339	+/- 0.0405	0.0744	0.100	pCi/g	1.0					
Promethium-146	U	0.0284	+/- 0.0489	0.0900	0.100	pCi/g	1.0					
Radium-226		1.22	+/- 0.248	0.141	1.00	pCi/g	1.0					
Radium-228		1.58	+/- 0.456	0.289	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.147	+/- 0.395	0.586	0.800	pCi/g	1.0					
Silver-110M	U	-0.0300	+/- 0.0398	0.0665	1.00	pCi/g	1.0					
Sodium-22	U	0.0324	+/- 0.0455	0.0864	0.700	pCi/g	1.0					
Thallium-208	J	0.582	+/- 0.133	0.0749	1.00	pCi/g	1.0					
Thorium-234	U	0.0877	+/- 2.07	2.25	1.00	pCi/g	1.0					
Tin-113	U	-0.0495	+/- 0.0477	0.0811	1.00	pCi/g	1.0					
Uranium-235	U	0.287	+/- 0.238	0.423	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00725	+/- 0.0422	0.0645	0.100	pCi/g	1.0					
Zinc-65	U	0.0188	+/- 0.106	0.168	0.200	pCi/g	1.0					
Zirconium-95	U	0.115	+/- 0.131	0.155	1.00	pCi/g	1.0					

Comments:

Eu-155 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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ENVIRONMENTAL PHYSICS, INC.

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-004.012

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-033.099 Room 111 SW Corner
Lab ID : 9802251-23
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.57	+/- 0.326	0.139	1.00	pCi/g	1.0	EJB	02/17/98	1446	116681	1
Americium-241	U	0.0391	+/- 0.128	0.176	0.400	pCi/g	1.0					
Antimony-124	U	-0.00585	+/- 0.0261	0.0451	1.00	pCi/g	1.0					
Antimony-125	U	-0.000924	+/- 0.0595	0.106	0.200	pCi/g	1.0					
Barium-133	U	-0.00841	+/- 0.0331	0.0482	1.00	pCi/g	1.0					
Barium-140	U	0.0564	+/- 0.153	0.275	1.00	pCi/g	1.0					
Beryllium-7	U	-0.101	+/- 0.209	0.361	1.00	pCi/g	1.0					
Bismuth-212		1.12	+/- 0.318	0.328	1.00	pCi/g	1.0					
Bismuth-214	J	0.977	+/- 0.169	0.0824	1.00	pCi/g	1.0					
Cerium-139	U	-0.00856	+/- 0.0195	0.0332	1.00	pCi/g	1.0					
Cerium-141	U	0.0153	+/- 0.0403	0.0709	1.00	pCi/g	1.0					
Cerium-144	U	0.0490	+/- 0.133	0.235	0.500	pCi/g	1.0					
Cesium-134	U	0.00398	+/- 0.0265	0.0412	0.100	pCi/g	1.0					
Cesium-136	U	-0.0224	+/- 0.0685	0.120	1.00	pCi/g	1.0					
Cesium-137	U	0.0131	+/- 0.0302	0.0479	5.00	pCi/g	1.0					
Chromium-51	U	-0.168	+/- 0.253	0.408	1.00	pCi/g	1.0					
Cobalt-56	U	0.0120	+/- 0.0258	0.0464	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0119	+/- 0.0161	0.0275	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00807	+/- 0.0268	0.0453	1.00	pCi/g	1.0					
Cobalt-60	U	0.0149	+/- 0.0271	0.0512	0.100	pCi/g	1.0					
Europium-152	U	0.0264	+/- 0.0653	0.112	0.500	pCi/g	1.0					
Europium-154	U	-0.0761	+/- 0.102	0.142	0.200	pCi/g	1.0					
Europium-155	U	0.0856	+/- 0.0683	0.124	0.200	pCi/g	1.0					
Iodine-131	U	-0.0102	+/- 0.0704	0.117	5.00	pCi/g	1.0					
Iridium-192	U	0.00459	+/- 0.0257	0.0389	1.00	pCi/g	1.0					
Iron-59	U	-0.0104	+/- 0.0646	0.114	1.00	pCi/g	1.0					
Lead-212		1.59	+/- 0.209	0.0736	1.00	pCi/g	1.0					

9802251-23

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Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621-033.099

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.14	+/- 0.183	0.0807	1.00	pCi/g	1.0					
Manganese-54	U	0.0259	+/- 0.0271	0.0494	0.100	pCi/g	1.0	EJB	02/17/98	1446	116681	1
Mercury-203	U	0.00	+/- 0.0376	0.0419	1.00	pCi/g	1.0					
Neodymium-147	U	-0.424	+/- 0.332	0.527	1.00	pCi/g	1.0					
Neptunium-239	U	0.0318	+/- 0.119	0.211	1.00	pCi/g	1.0					
Niobium-94	U	0.00714	+/- 0.0244	0.0431	1.00	pCi/g	1.0					
Niobium-95	U	0.00299	+/- 0.0360	0.0551	1.00	pCi/g	1.0					
Potassium-40		20.8	+/- 2.41	0.406	1.00	pCi/g	1.0					
Promethium-144	U	-0.00980	+/- 0.0239	0.0404	0.100	pCi/g	1.0					
Promethium-146	U	0.0170	+/- 0.0292	0.0535	0.100	pCi/g	1.0					
Radium-226	J	0.977	+/- 0.169	0.0824	1.00	pCi/g	1.0					
Radium-228		1.57	+/- 0.326	0.139	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0128	+/- 0.214	0.375	0.800	pCi/g	1.0					
Silver-110M	U	-0.00770	+/- 0.0232	0.0397	1.00	pCi/g	1.0					
Sodium-22	U	-0.0273	+/- 0.0364	0.0508	0.700	pCi/g	1.0					
Thallium-208	J	0.504	+/- 0.0758	0.0379	1.00	pCi/g	1.0					
Thorium-234	U	0.893	+/- 1.20	1.45	1.00	pCi/g	1.0					
Tin-113	U	-0.0247	+/- 0.0287	0.0491	1.00	pCi/g	1.0					
Uranium-235	U	0.131	+/- 0.139	0.245	0.500	pCi/g	1.0					
Yttrium-88	U	0.00485	+/- 0.0229	0.0392	0.100	pCi/g	1.0					
Zinc-65	U	-0.0280	+/- 0.0705	0.105	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0360	+/- 0.0578	0.0819	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621-033.099

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID	: 98A0621-035.105 Room 131 East
Lab ID	: 9802251-24
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.32	+/- 0.274	0.123	1.00	pCi/g	1.0	EJB	02/17/98	1446	116681	1
Americium-241	U	0.0203	+/- 0.163	0.278	0.400	pCi/g	1.0					
Antimony-124	U	-0.00621	+/- 0.0221	0.0387	1.00	pCi/g	1.0					
Antimony-125	U	0.00213	+/- 0.0517	0.0941	0.200	pCi/g	1.0					
Barium-133	U	-0.00606	+/- 0.0298	0.0445	1.00	pCi/g	1.0					
Barium-140	U	0.0450	+/- 0.139	0.253	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0758	+/- 0.176	0.311	1.00	pCi/g	1.0					
Bismuth-212		1.13	+/- 0.375	0.293	1.00	pCi/g	1.0					
Bismuth-214	J	0.928	+/- 0.150	0.0659	1.00	pCi/g	1.0					
Cerium-139	U	-0.00441	+/- 0.0173	0.0306	1.00	pCi/g	1.0					
Cerium-141	U	0.000611	+/- 0.0424	0.0620	1.00	pCi/g	1.0					
Cerium-144	U	-0.109	+/- 0.119	0.206	0.500	pCi/g	1.0					
Cesium-134	U	-0.00672	+/- 0.0218	0.0331	0.100	pCi/g	1.0					
Cesium-136	U	0.0354	+/- 0.0617	0.116	1.00	pCi/g	1.0					
Cesium-137	U	-0.0113	+/- 0.0216	0.0370	5.00	pCi/g	1.0					
Chromium-51	U	-0.0676	+/- 0.214	0.362	1.00	pCi/g	1.0					
Cobalt-56	U	0.0136	+/- 0.0243	0.0439	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00348	+/- 0.0150	0.0270	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00574	+/- 0.0215	0.0369	1.00	pCi/g	1.0					
Cobalt-60	U	0.0141	+/- 0.0241	0.0455	0.100	pCi/g	1.0					
Europium-152	U	-0.0387	+/- 0.0594	0.0980	0.500	pCi/g	1.0					
Europium-154	U	0.00132	+/- 0.0763	0.137	0.200	pCi/g	1.0					
Europium-155	U	0.0335	+/- 0.0642	0.119	0.200	pCi/g	1.0					
Iodine-131	U	-0.0286	+/- 0.0646	0.107	5.00	pCi/g	1.0					
Iridium-192	U	0.00953	+/- 0.0202	0.0355	1.00	pCi/g	1.0					
Iron-59	U	-0.00908	+/- 0.0565	0.101	1.00	pCi/g	1.0					
Lead-212		1.41	+/- 0.179	0.0571	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Idcker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCD00797 Report Date: February 24, 1998

Sample ID : 98A0621-035.105

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.08	+/- 0.162	0.0709	1.00	pCi/g	1.0					
Manganese-54	U	0.0186	+/- 0.0219	0.0422	0.100	pCi/g	1.0	EJB	02/17/98	1446	116681	1
Mercury-203	U	0.00	+/- 0.0561	0.0407	1.00	pCi/g	1.0					
Neodymium-147	U	0.173	+/- 0.297	0.549	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0824	+/- 0.114	0.203	1.00	pCi/g	1.0					
Niobium-94	U	-0.00145	+/- 0.0201	0.0352	1.00	pCi/g	1.0					
Niobium-95	U	0.0251	+/- 0.0279	0.0466	1.00	pCi/g	1.0					
Potassium-40		27.2	+/- 3.04	0.340	1.00	pCi/g	1.0					
Promethium-144	U	-0.000128	+/- 0.0207	0.0364	0.100	pCi/g	1.0					
Promethium-146	U	0.0222	+/- 0.0249	0.0469	0.100	pCi/g	1.0					
Radium-226	J	0.928	+/- 0.150	0.0659	1.00	pCi/g	1.0					
Radium-228		1.32	+/- 0.274	0.123	1.00	pCi/g	1.0					
Ruthenium-106	U	0.0121	+/- 0.185	0.330	0.800	pCi/g	1.0					
Silver-110M	U	-0.00563	+/- 0.0200	0.0348	1.00	pCi/g	1.0					
Sodium-22	U	0.000197	+/- 0.0273	0.0488	0.700	pCi/g	1.0					
Thallium-208	J	0.426	+/- 0.0682	0.0396	1.00	pCi/g	1.0					
Thorium-234	U	0.577	+/- 1.59	1.97	1.00	pCi/g	1.0					
Tin-113	U	0.00139	+/- 0.0246	0.0450	1.00	pCi/g	1.0					
Uranium-235	U	0.00266	+/- 0.185	0.230	0.500	pCi/g	1.0					
Yttrium-88	U	-0.00536	+/- 0.0234	0.0409	0.100	pCi/g	1.0					
Zinc-65	U	0.0304	+/- 0.0796	0.0912	0.200	pCi/g	1.0					
Zirconium-95	U	0.0671	+/- 0.0427	0.0785	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-035.105

M = Method	Method-Description

Notes:
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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Idcker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID	: 98A0621-003.009 Room 111 SE Corner
Lab ID	: 9802251-25
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.57	+/- 0.357	0.179	1.00	pCi/g	1.0	EJB	02/17/98	1447	116681	1
Americium-241	U	-0.0923	+/- 0.124	0.187	0.400	pCi/g	1.0					
Antimony-124	U	0.00279	+/- 0.0312	0.0546	1.00	pCi/g	1.0					
Antimony-125	U	-0.0105	+/- 0.0727	0.118	0.200	pCi/g	1.0					
Barium-133	U	-0.0155	+/- 0.0399	0.0566	1.00	pCi/g	1.0					
Barium-140	U	0.135	+/- 0.185	0.331	1.00	pCi/g	1.0					
Beryllium-7	U	-0.145	+/- 0.259	0.382	1.00	pCi/g	1.0					
Bismuth-212		1.14	+/- 0.514	0.364	1.00	pCi/g	1.0					
Bismuth-214	J	0.826	+/- 0.163	0.0906	1.00	pCi/g	1.0					
Cerium-139	U	0.00737	+/- 0.0229	0.0389	1.00	pCi/g	1.0					
Cerium-141	U	0.00909	+/- 0.0467	0.0793	1.00	pCi/g	1.0					
Cerium-144	U	0.0499	+/- 0.155	0.265	0.500	pCi/g	1.0					
Cesium-134	U	0.00349	+/- 0.0308	0.0476	0.100	pCi/g	1.0					
Cesium-136	U	-0.0201	+/- 0.0999	0.145	1.00	pCi/g	1.0					
Cesium-137	U	0.0373	+/- 0.0575	0.0526	5.00	pCi/g	1.0					
Chromium-51	U	-0.311	+/- 0.341	0.464	1.00	pCi/g	1.0					
Cobalt-56	U	0.00276	+/- 0.0342	0.0593	1.00	pCi/g	1.0					
Cobalt-57	U	0.00599	+/- 0.0190	0.0327	0.100	pCi/g	1.0					
Cobalt-58	U	0.00668	+/- 0.0326	0.0572	1.00	pCi/g	1.0					
Cobalt-60	U	-0.000485	+/- 0.0298	0.0543	0.100	pCi/g	1.0					
Europium-152	U	-0.0403	+/- 0.0785	0.126	0.500	pCi/g	1.0					
Europium-154	U	-0.0544	+/- 0.110	0.188	0.200	pCi/g	1.0					
Europium-155	U	0.00	+/- 0.121	0.122	0.200	pCi/g	1.0					
Iodine-131	U	0.00198	+/- 0.0877	0.145	5.00	pCi/g	1.0					
Iridium-192	U	0.0133	+/- 0.0565	0.0482	1.00	pCi/g	1.0					
Iron-59	U	0.00652	+/- 0.0785	0.135	1.00	pCi/g	1.0					
Lead-212		1.49	+/- 0.187	0.0742	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

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Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621-003.009

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.875	+/- 0.160	0.0941	1.00	pCi/g	1.0					
Manganese-54	U	-0.00153	+/- 0.0326	0.0492	0.100	pCi/g	1.0	EJB	02/17/98	1447	116681	1
Mercury-203	U	-0.00664	+/- 0.0314	0.0516	1.00	pCi/g	1.0					
Neodymium-147	U	0.297	+/- 0.392	0.717	1.00	pCi/g	1.0					
Neptunium-239	U	0.119	+/- 0.136	0.243	1.00	pCi/g	1.0					
Niobium-94	U	-0.0331	+/- 0.0330	0.0450	1.00	pCi/g	1.0					
Niobium-95	U	0.0173	+/- 0.0431	0.0679	1.00	pCi/g	1.0					
Potassium-40		30.0	+/- 3.55	0.448	1.00	pCi/g	1.0					
Promethium-144	U	0.00229	+/- 0.0321	0.0492	0.100	pCi/g	1.0					
Promethium-146	U	0.0105	+/- 0.0342	0.0612	0.100	pCi/g	1.0					
Radium-226	J	0.826	+/- 0.163	0.0906	1.00	pCi/g	1.0					
Radium-228		1.57	+/- 0.357	0.179	1.00	pCi/g	1.0					
Ruthenium-106	U	0.190	+/- 0.248	0.458	0.800	pCi/g	1.0					
Silver-110M	U	0.00409	+/- 0.0322	0.0499	1.00	pCi/g	1.0					
Sodium-22	U	-0.0193	+/- 0.0393	0.0672	0.700	pCi/g	1.0					
Thallium-208	J	0.465	+/- 0.0904	0.0466	1.00	pCi/g	1.0					
Thorium-234		1.62	+/- 1.44	1.58	1.00	pCi/g	1.0					
Tin-113	U	0.00441	+/- 0.0360	0.0598	1.00	pCi/g	1.0					
Uranium-235	U	0.101	+/- 0.160	0.275	0.500	pCi/g	1.0					
Yttrium-88	U	0.00727	+/- 0.0242	0.0486	0.100	pCi/g	1.0					
Zinc-65	U	0.0683	+/- 0.0895	0.144	0.200	pCi/g	1.0					
Zirconium-95	U	0.0269	+/- 0.0608	0.108	1.00	pCi/g	1.0					

Comments:
Eu-155 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company. L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621-003.009

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J Indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath, at (803) 556-8171.

Reviewed By

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-006.018 Room 117 NE Corner
Lab ID : 9802251-26
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		2.08	+/- 0.391	0.186	1.00	pCi/g	1.0	EJB	02/17/98	1448	116681	1
Americium-241	U	-0.0382	+/- 0.123	0.195	0.400	pCi/g	1.0					
Antimony-124	U	0.0110	+/- 0.0289	0.0509	1.00	pCi/g	1.0					
Antimony-125	U	0.00509	+/- 0.0681	0.120	0.200	pCi/g	1.0					
Barium-133	U	0.000680	+/- 0.0343	0.0538	1.00	pCi/g	1.0					
Barium-140	U	0.0793	+/- 0.173	0.306	1.00	pCi/g	1.0					
Beryllium-7	U	-0.130	+/- 0.271	0.401	1.00	pCi/g	1.0					
Bismuth-212		1.57	+/- 0.460	0.376	1.00	pCi/g	1.0					
Bismuth-214		1.20	+/- 0.188	0.0896	1.00	pCi/g	1.0					
Cerium-139	U	-0.00293	+/- 0.0219	0.0372	1.00	pCi/g	1.0					
Cerium-141	U	0.00510	+/- 0.0512	0.0788	1.00	pCi/g	1.0					
Cerium-144	U	-0.142	+/- 0.149	0.244	0.500	pCi/g	1.0					
Cesium-134	U	-0.0141	+/- 0.0286	0.0413	0.100	pCi/g	1.0					
Cesium-136	U	-0.0409	+/- 0.0794	0.135	1.00	pCi/g	1.0					
Cesium-137	U	-0.0247	+/- 0.0292	0.0472	5.00	pCi/g	1.0					
Chromium-51	U	-0.0565	+/- 0.268	0.439	1.00	pCi/g	1.0					
Cobalt-56	U	0.00735	+/- 0.0294	0.0509	1.00	pCi/g	1.0					
Cobalt-57	U	-0.0103	+/- 0.0180	0.0304	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00129	+/- 0.0274	0.0467	1.00	pCi/g	1.0					
Cobalt-60	U	-0.00713	+/- 0.0305	0.0527	0.100	pCi/g	1.0					
Europium-152	U	0.00864	+/- 0.0729	0.121	0.500	pCi/g	1.0					
Europium-154	U	0.0419	+/- 0.0973	0.176	0.200	pCi/g	1.0					
Europium-155	U	0.104	+/- 0.113	0.132	0.200	pCi/g	1.0					
Iodine-131	U	-0.0186	+/- 0.0727	0.127	5.00	pCi/g	1.0					
Iridium-192	U	-0.0147	+/- 0.0258	0.0414	1.00	pCi/g	1.0					
Iron-59	U	-0.0316	+/- 0.0804	0.118	1.00	pCi/g	1.0					
Lead-212		2.07	+/- 0.254	0.0686	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-006.018

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.30	+/- 0.194	0.0900	1.00	pCi/g	1.0					
Manganese-54	U	0.0188	+/- 0.0322	0.0503	0.100	pCi/g	1.0	EJB	02/17/98	1448	116681	1
Mercury-203	U	0.00	+/- 0.0531	0.0497	1.00	pCi/g	1.0					
Neodymium-147	U	0.376	+/- 0.394	0.713	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0583	+/- 0.150	0.229	1.00	pCi/g	1.0					
Niobium-94	U	0.000481	+/- 0.0264	0.0452	1.00	pCi/g	1.0					
Niobium-95	U	0.0689	+/- 0.0552	0.0693	1.00	pCi/g	1.0					
Potassium-40		28.5	+/- 3.21	0.441	1.00	pCi/g	1.0					
Promethium-144	U	0.0125	+/- 0.0264	0.0465	0.100	pCi/g	1.0					
Promethium-146	U	0.0108	+/- 0.0313	0.0558	0.100	pCi/g	1.0					
Radium-226		1.20	+/- 0.188	0.0896	1.00	pCi/g	1.0					
Radium-228		2.08	+/- 0.391	0.186	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.208	+/- 0.253	0.411	0.800	pCi/g	1.0					
Silver-110M	U	-0.00626	+/- 0.0265	0.0449	1.00	pCi/g	1.0					
Sodium-22	U	0.0152	+/- 0.0348	0.0629	0.700	pCi/g	1.0					
Thallium-208	J	0.632	+/- 0.0958	0.0484	1.00	pCi/g	1.0					
Thorium-234		2.77	+/- 1.85	1.57	1.00	pCi/g	1.0					
Tin-113	U	0.00139	+/- 0.0332	0.0585	1.00	pCi/g	1.0					
Uranium-235	U	0.138	+/- 0.204	0.268	0.500	pCi/g	1.0					
Yttrium-88	U	0.00979	+/- 0.0276	0.0537	0.100	pCi/g	1.0					
Zinc-65	U	0.0384	+/- 0.0790	0.126	0.200	pCi/g	1.0					
Zirconium-95	U	0.000232	+/- 0.0569	0.0969	1.00	pCi/g	1.0					

Comments:
Hg-203 not quantified due to interference.

M = Method	Method-Description
M 1	HASL 300

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CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-006.018

M = Method **Method-Description**

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-032.096 Room 124 East
Lab ID : 9802251-27
Matrix : Misc.
Date Collected : 02/04/98
Date Received : 02/07/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.23	+/- 0.254	0.162	1.00	pCi/g	1.0	EJB	02/17/98	1448	116681	1
Americium-241	U	-0.0172	+/- 0.107	0.169	0.400	pCi/g	1.0					
Antimony-124	U	-0.0130	+/- 0.0208	0.0362	1.00	pCi/g	1.0					
Antimony-125	U	-0.0343	+/- 0.0532	0.0877	0.200	pCi/g	1.0					
Barium-133	U	0.0153	+/- 0.0252	0.0414	1.00	pCi/g	1.0					
Barium-140	U	0.0521	+/- 0.153	0.265	1.00	pCi/g	1.0					
Beryllium-7	U	-0.0443	+/- 0.181	0.306	1.00	pCi/g	1.0					
Bismuth-212	J	0.760	+/- 0.341	0.327	1.00	pCi/g	1.0					
Bismuth-214	J	0.893	+/- 0.158	0.0669	1.00	pCi/g	1.0					
Cerium-139	U	-0.000335	+/- 0.0166	0.0272	1.00	pCi/g	1.0					
Cerium-141	U	-0.00240	+/- 0.0318	0.0577	1.00	pCi/g	1.0					
Cerium-144	U	-0.0185	+/- 0.121	0.198	0.500	pCi/g	1.0					
Cesium-134	U	-0.0152	+/- 0.0218	0.0326	0.100	pCi/g	1.0					
Cesium-136	U	0.00239	+/- 0.0653	0.115	1.00	pCi/g	1.0					
Cesium-137	U	0.0233	+/- 0.0203	0.0364	5.00	pCi/g	1.0					
Chromium-51	U	-0.110	+/- 0.203	0.345	1.00	pCi/g	1.0					
Cobalt-56	U	0.00411	+/- 0.0242	0.0438	1.00	pCi/g	1.0					
Cobalt-57	U	0.00121	+/- 0.0147	0.0245	0.100	pCi/g	1.0					
Cobalt-58	U	-0.00885	+/- 0.0220	0.0381	1.00	pCi/g	1.0					
Cobalt-60	U	0.00202	+/- 0.0246	0.0458	0.100	pCi/g	1.0					
Europium-152	U	0.0555	+/- 0.0507	0.0968	0.500	pCi/g	1.0					
Europium-154	U	-0.0212	+/- 0.0778	0.131	0.200	pCi/g	1.0					
Europium-155	U	0.0478	+/- 0.0610	0.106	0.200	pCi/g	1.0					
Iodine-131	U	-0.0304	+/- 0.0581	0.0979	5.00	pCi/g	1.0					
Iridium-192	U	0.0146	+/- 0.0193	0.0352	1.00	pCi/g	1.0					
Iron-59	U	-0.0107	+/- 0.0546	0.0939	1.00	pCi/g	1.0					
Lead-212		1.13	+/- 0.158	0.0542	1.00	pCi/g	1.0					

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9802251-27-

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 2 of 3

Sample ID : 98A0621-032.096

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214	J	0.991	+/- 0.166	0.0668	1.00	pCi/g	1.0					
Manganese-54	U	0.0116	+/- 0.0238	0.0437	0.100	pCi/g	1.0	EJB	02/17/98	1448	116681	1
Mercury-203	U	-0.00476	+/- 0.0249	0.0388	1.00	pCi/g	1.0					
Neodymium-147	U	-0.243	+/- 0.306	0.484	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0670	+/- 0.107	0.174	1.00	pCi/g	1.0					
Niobium-94	U	0.00873	+/- 0.0201	0.0372	1.00	pCi/g	1.0					
Niobium-95	U	0.0400	+/- 0.0333	0.0597	1.00	pCi/g	1.0					
Potassium-40		23.0	+/- 2.55	0.344	1.00	pCi/g	1.0					
Promethium-144	U	-0.00507	+/- 0.0214	0.0378	0.100	pCi/g	1.0					
Promethium-146	U	0.00282	+/- 0.0245	0.0427	0.100	pCi/g	1.0					
Radium-226	J	0.893	+/- 0.158	0.0669	1.00	pCi/g	1.0					
Radium-228		1.23	+/- 0.254	0.162	1.00	pCi/g	1.0					
Ruthenium-106	U	-0.0708	+/- 0.176	0.312	0.800	pCi/g	1.0					
Silver-110M	U	0.00691	+/- 0.0216	0.0358	1.00	pCi/g	1.0					
Sodium-22	U	-0.00731	+/- 0.0279	0.0470	0.700	pCi/g	1.0					
Thallium-208	J	0.382	+/- 0.0708	0.0363	1.00	pCi/g	1.0					
Thorium-234		2.06	+/- 1.89	1.36	1.00	pCi/g	1.0					
Tin-113	U	0.00195	+/- 0.0253	0.0442	1.00	pCi/g	1.0					
Uranium-235	U	0.0722	+/- 0.125	0.210	0.500	pCi/g	1.0					
Yttrium-88	U	0.00836	+/- 0.0205	0.0414	0.100	pCi/g	1.0					
Zinc-65	U	-0.0176	+/- 0.0636	0.0935	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0230	+/- 0.0412	0.0706	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 3 of 3

Sample ID : 98A0621-032.096

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464

Contact: Ms. Virgene Ideker

Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998 Page 1 of 3

Sample ID	: 98A0621-036.108 Room 131C
Lab ID	: 9802251-28
Matrix	: Misc.
Date Collected	: 02/04/98
Date Received	: 02/07/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological												
Gamma PHA - 98 items												
Actinium-228		1.23	+/- 0.325	0.294	1.00	pCi/g	1.0	EJB	02/17/98	1449	116681	1
Americium-241	U	0.0122	+/- 0.228	0.262	0.400	pCi/g	1.0					
Antimony-124	U	0.0383	+/- 0.0526	0.0848	1.00	pCi/g	1.0					
Antimony-125	U	-0.00737	+/- 0.111	0.197	0.200	pCi/g	1.0					
Barium-133	U	0.0181	+/- 0.0569	0.0903	1.00	pCi/g	1.0					
Barium-140	U	0.141	+/- 0.295	0.529	1.00	pCi/g	1.0					
Beryllium-7	U	-0.360	+/- 0.391	0.654	1.00	pCi/g	1.0					
Bismuth-212		1.25	+/- 0.710	0.615	1.00	pCi/g	1.0					
Bismuth-214	J	0.971	+/- 0.292	0.157	1.00	pCi/g	1.0					
Cerium-139	U	0.0342	+/- 0.0373	0.0568	1.00	pCi/g	1.0					
Cerium-141	U	0.0604	+/- 0.0804	0.126	1.00	pCi/g	1.0					
Cerium-144	U	-0.0703	+/- 0.236	0.407	0.500	pCi/g	1.0					
Cesium-134	U	0.0164	+/- 0.0493	0.0767	0.100	pCi/g	1.0					
Cesium-136	U	-0.107	+/- 0.115	0.192	1.00	pCi/g	1.0					
Cesium-137	U	0.00279	+/- 0.0453	0.0798	5.00	pCi/g	1.0					
Chromium-51	U	-0.115	+/- 0.411	0.688	1.00	pCi/g	1.0					
Cobalt-56	U	0.0336	+/- 0.0501	0.0909	1.00	pCi/g	1.0					
Cobalt-57	U	-0.00645	+/- 0.0284	0.0493	0.100	pCi/g	1.0					
Cobalt-58	U	0.0305	+/- 0.0439	0.0811	1.00	pCi/g	1.0					
Cobalt-60	U	-0.0226	+/- 0.0423	0.0723	0.100	pCi/g	1.0					
Europium-152	U	0.0140	+/- 0.116	0.198	0.500	pCi/g	1.0					
Europium-154	U	0.00914	+/- 0.140	0.253	0.200	pCi/g	1.0					
Europium-155	U	0.129	+/- 0.151	0.209	0.200	pCi/g	1.0					
Iodine-131	U	0.0566	+/- 0.117	0.214	5.00	pCi/g	1.0					
Iridium-192	U	0.000103	+/- 0.0389	0.0661	1.00	pCi/g	1.0					
Iron-59	U	0.00438	+/- 0.0991	0.179	1.00	pCi/g	1.0					
Lead-212		1.23	+/- 0.214	0.122	1.00	pCi/g	1.0					

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CERTIFICATE OF ANALYSIS

Client: Kaiser Hill Company, L.L.C.
Rocky Flats Environmental Tech. Site
Bldg. 881
Golden, Colorado 80402-0464
Contact: Ms. Virgene Ideker
Project Description: Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-036.108

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead-214		1.18	+/- 0.234	0.141	1.00	pCi/g	1.0					
Manganese-54	U	0.0328	+/- 0.0456	0.0831	0.100	pCi/g	1.0	EJB	02/17/98	1449	116681	1
Mercury-203	U	0.0468	+/- 0.0439	0.0749	1.00	pCi/g	1.0					
Neodymium-147	U	0.0640	+/- 0.616	1.10	1.00	pCi/g	1.0					
Neptunium-239	U	-0.0920	+/- 0.217	0.375	1.00	pCi/g	1.0					
Niobium-94	U	0.000572	+/- 0.0421	0.0735	1.00	pCi/g	1.0					
Niobium-95	U	-0.0290	+/- 0.0623	0.105	1.00	pCi/g	1.0					
Potassium-40		21.9	+/- 2.73	0.636	1.00	pCi/g	1.0					
Promethium-144	U	-0.0128	+/- 0.0413	0.0707	0.100	pCi/g	1.0					
Promethium-146	U	-0.0364	+/- 0.0565	0.0825	0.100	pCi/g	1.0					
Radium-226	J	0.971	+/- 0.292	0.157	1.00	pCi/g	1.0					
Radium-228		1.23	+/- 0.325	0.294	1.00	pCi/g	1.0					
Ruthenium-106	U	0.304	+/- 0.374	0.688	0.800	pCi/g	1.0					
Silver-110M	U	-0.0219	+/- 0.0420	0.0710	1.00	pCi/g	1.0					
Sodium-22	U	-0.00563	+/- 0.0510	0.0904	0.700	pCi/g	1.0					
Thallium-208	J	0.520	+/- 0.120	0.0768	1.00	pCi/g	1.0					
Thorium-234		3.59	+/- 2.81	2.21	1.00	pCi/g	1.0					
Tin-113	U	-0.00323	+/- 0.0495	0.0882	1.00	pCi/g	1.0					
Uranium-235	U	0.225	+/- 0.248	0.437	0.500	pCi/g	1.0					
Yttrium-88	U	0.0164	+/- 0.0377	0.0755	0.100	pCi/g	1.0					
Zinc-65	U	-0.00618	+/- 0.113	0.174	0.200	pCi/g	1.0					
Zirconium-95	U	-0.0496	+/- 0.0848	0.141	1.00	pCi/g	1.0					

M = Method	Method-Description
M 1	HASL 300

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

P. O. Box 30712 • Charleston, SC 29417 • (803) 556-8171 • Fax (803) 766-1178

ENVIRONMENTAL PHYSICS, INC.

ENVIRONMENTAL PHYSICS, INC.

A General Engineering Laboratories, Inc. Affiliate.

CERTIFICATE OF ANALYSIS

Client:	Kaiser Hill Company, L.L.C. Rocky Flats Environmental Tech. Site Bldg. 881 Golden, Colorado 80402-0464
Contact:	Ms. Virgene Ideker
Project Description:	Environmental samples Rapid (D) Turnaround

cc: KHCO00797 Report Date: February 24, 1998

Sample ID : 98A0621-036.108

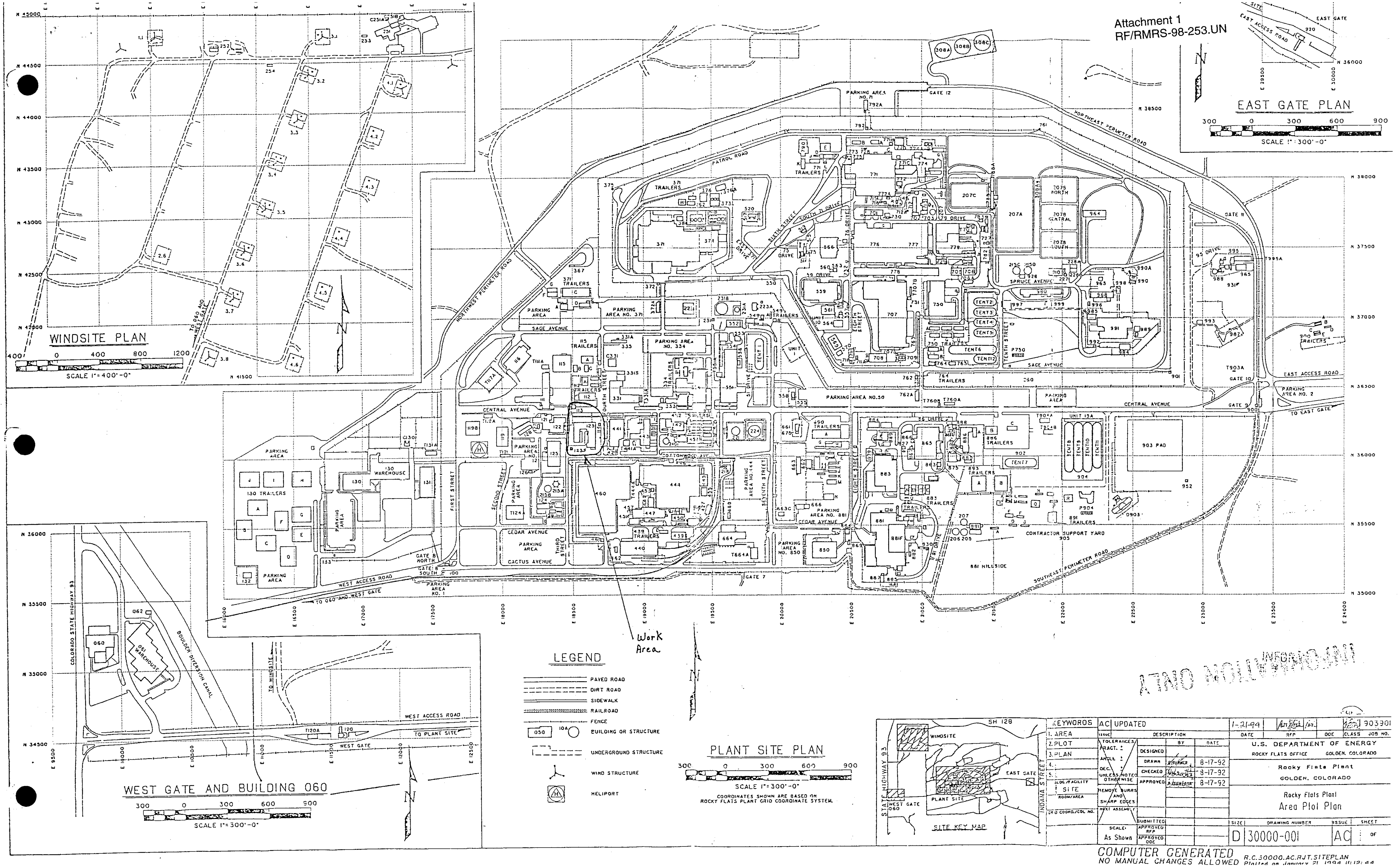
M = Method **Method-Description**

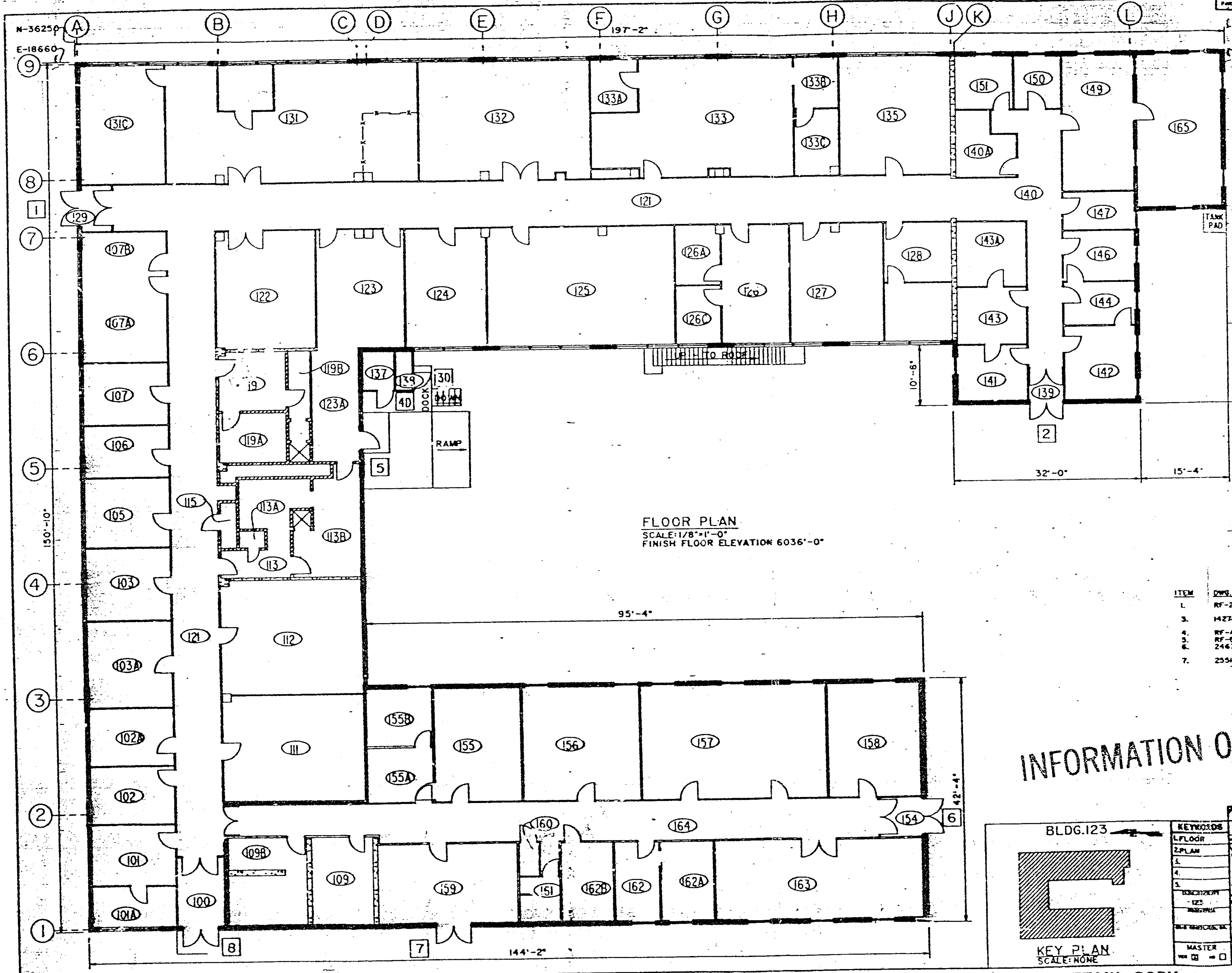
This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Lee Heath at (803) 556-8171.

Reviewed By

P. O. Box 30712 • Charleston, SC 29417 • (803) 556-8171 • Fax (803) 766-1178

Attachment 1
RF/RMRS-98-253.UN





FLOOR PLAN
SCALE: 1/8"=1'-0"
FINISH FLOOR ELEVATION 6036'-0"

LEGEND

- EXTERIOR WALL
- CONCRETE WALL
- CONCRETE BLOCK WALL
- PARTITION WALL
- FIRE WALL
- (XXX) ROOM NUMBER
- [XX] EXTERIOR DOOR NUMBER

BUILDING AREA

18,891 SQUARE FEET

UNASSIGNED ROOM NUMBERS

104	134
108	136
110	145
114	148
116	152
117	153
118	166 THRU 199
120	
130	

REFERENCE DRAWINGS

ITEM	DWG. NO	TITLE	JOB
L	RF-23-A-1	FIRST FLOOR PLAN	ORIGINAL CONST.
3.	14276-2	LAB STOCK ROOM & OFFICE REVISIONS	GROUP - 603
4.	RF-AA-23-C-1	ACCESS DOOR	
5.	RF-8Z-20731-02	ADDITION & MODIF. LOW LEVEL RADIATION	GROUP - 22 CONTRACT "8Z"
6.	24631-003	SURVEILLANCE LABORATORY	INV. NO 292-73-7
7.	25510	ROOM ADDITION	

INFORMATION ONLY

FOR REFERENCE ONLY

BLDG.123

KEY PLAN
SCALE: NONE

RETAIN COPY

KEYWORDS				
1.FLOOR	J	UPDATED	10-16-93	BP TB
2.PLAN	H	REDRAWN	12-1-87	MR AB VT LMS

		BY	DATE
	DRAWN	ROSS	8-27-87
	CHECKED	BARR	11-19-87
	APPROVED	TERKUN	12-1-87

SCALE: 1/8"=1'-0"

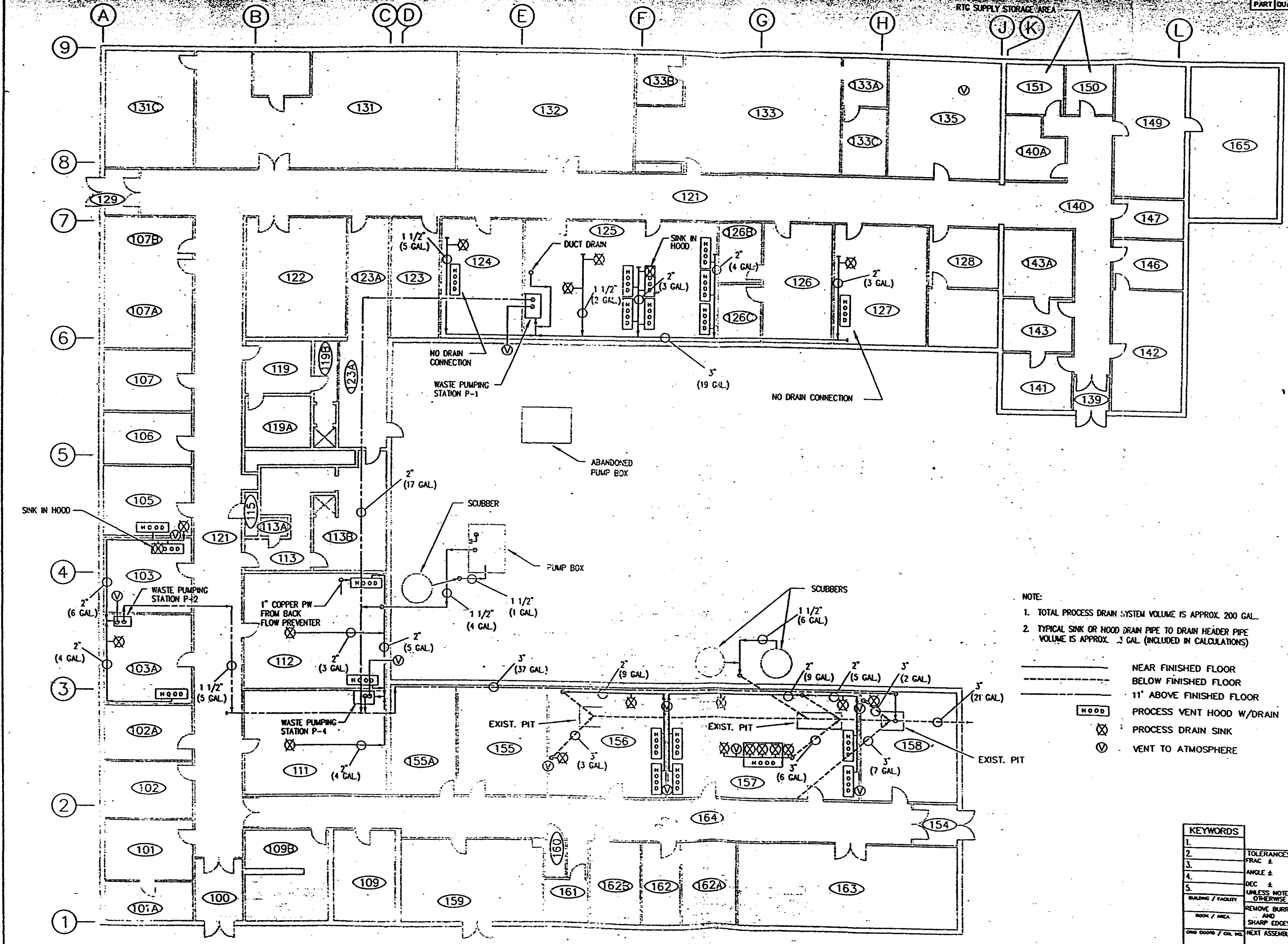
MASTER

U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO
Rockwell International
ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

BUILING 123
FLOOR PLAN

SIZE	DRAWING NUMBER	ISSUE	SHEET
D	30123-1	J	

COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED
FP.MASTER.123.1.FLP



NOTE:

1. TOTAL PROCESS DRAIN SYSTEM VOLUME IS APPROX. 200 GAL.
2. TYPICAL SINK OR HOOD DRAIN PIPE TO DRAIN HEADER PIPE VOLUME IS APPROX. .1 GAL. (INCLUDED IN CALCULATIONS)

(solid line)	NEAR FINISHED FLOOR
(dashed line)	BELOW FINISHED FLOOR
(solid line)	11' ABOVE FINISHED FLOOR
HOOD	PROCESS VENT HOOD W/DRAIN
⊗	PROCESS DRAIN SINK
Ⓥ	VENT TO ATMOSPHERE

KEYWORDS	TOLERANCES		BY	DATE	
1.	FRAC ±	DESIGNED			U.S. DEPARTMENT O
2.	ANGLE ±	DRAWN		11/25/97	Rocky Flats Environmental
3.	DEC ±	CHECKED			GOLDEN, COLOR
4.	UNLESS NOTED OTHERWISE	APPROVED			BUILDING
5.	REMOVE BURRS AND SHARP EDGES				
BUILDING / FACILITY	NEXT ASSEMBLY	SUBMITTED			SIZE: D
ROOM / AREA	SCALE: 1/8"=1'	APPV RFP			DRAWING NUMBER: SK-001
GRID COORD / COL NO.		APPV DOE			

DSIZE FORMAT REV D NOVEMBER 1994

AUTOCAD REL 12 GENERATED

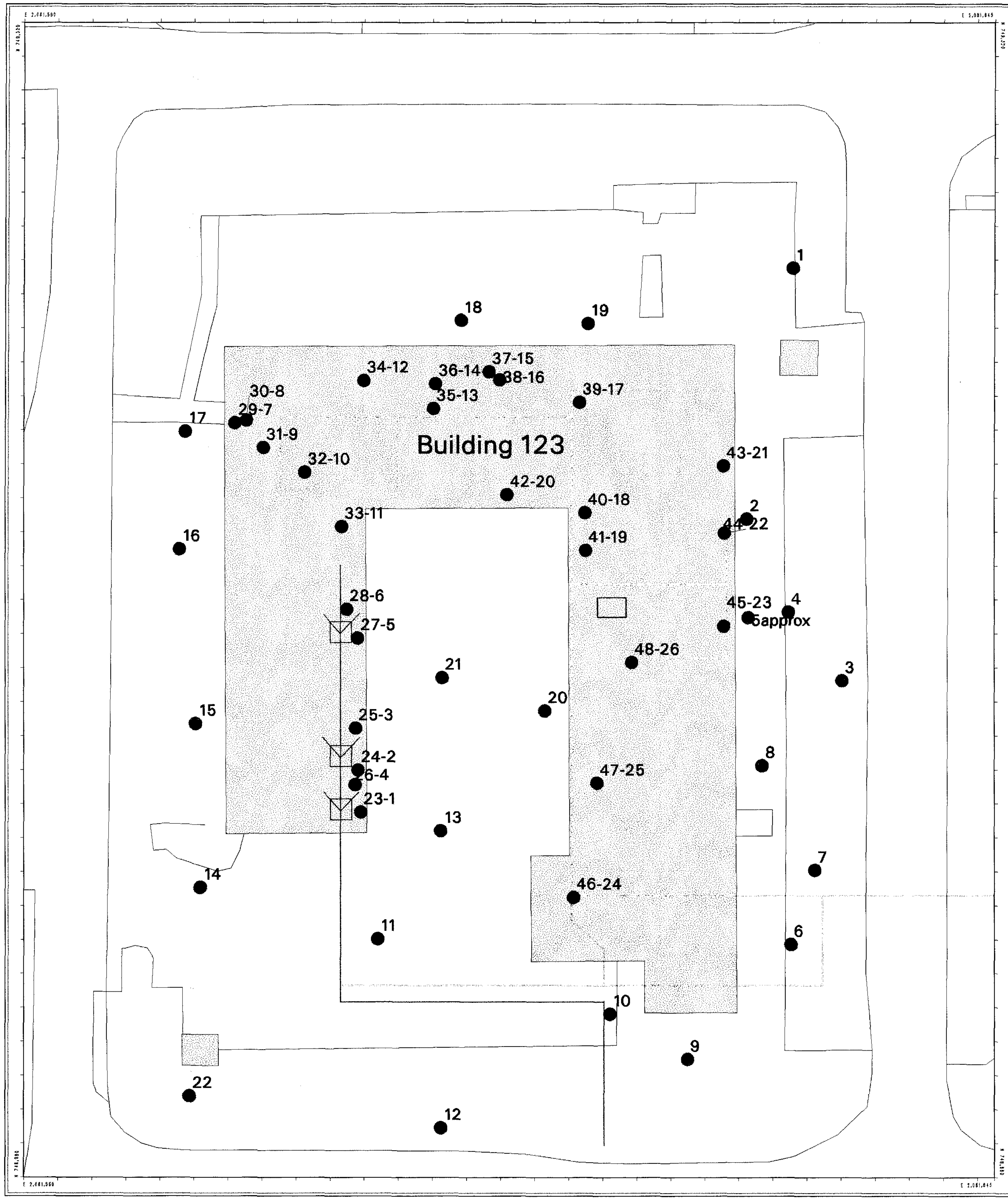
NO MANUAL CHANGES ALLOWED

ACAD ARCHIVE

DRAFTING CHECK

PLOTTED SCALE

K:\970209\SK-001 ... 6 12:10:05 1997



Location of Building 123
Borehole Sampling

EXPLANATION

- IHSS 121 (OPWL) Original process waste line (Approximate location)
- RCRA Unit 40 (Approximate location)
- Borehole location

Standard Map Features

- Buildings and other structures
- Paved roads
- Dirt roads

DATA SOURCE: *Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95*

Scale = 1 : 410
1 inch represents approximately 34 feet

10 0 20 40ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

RMRS Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 98-0251 September 23, 1998

/gis2/projects/fy98/98-0251/bldg-123-bh-b.aml